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The financial and conceptual foundations of intangible asset manager capitalism

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ABSTRACT

The text exposes the main insights acquired after LEHMAN BROTHERS' (LBHI) autopsy, and the autopsy of May 6, 2010 FLASH CRASH and shows how these autopsies revealed the flaws of orthodox NEOCLASSICAL ECONOMIC THEORY hacked from NEWTONIAN PHYSICS, in explaining and predicting the catastrophic events of the near economic history, and suggests perspectives of understanding the role of Alan Greenspan's (1987-2006) monetary policies of suppression of financial volatility in the United States that veered towards persistently loose-money enabling the emergence of unimpeded global dominance of plutocratic ASSET MANAGER CAPITALISM that simultaneously produced a decade long secular stagnation in the rich world with global sharp steady increases in inequality of wealth and income distribution before, during and after the 2008 financial crisis. The text tries to shed light on the development of an increasingly global legal system, which codifies different forms of tangible and intangible property to protect ownership claims from states' and their national courts' challenges. It attempts to show how continuing disequilibria between spending and saving, saving and investment within and between major economies, led to rising inequality that produced gluts of manufactured goods, job losses, and rising indebtedness in the United States, an economic and financial perversion of what global integration of Washington Consensus promised to achieve. Paradoxically, instead a more US-dollar centric global financial system emerged since the demise of the Bretton Woods fixed exchange rate system, and US, a low productivity growth economy of deregulated entrepreneurial financial markets, emerged as the main supplier of the global currency to world markets especially to People's Republic of China to expand its global value chains (GVCs). PRC is a large high productivity growth economy, with not yet globally developed financial markets and is dependent on the US dollar for now. Post-WTO global economic order put in place at the end of 20th century is under stress. ANT FINANCIAL's aborted IPO in 2020, the most integrated fin-tech platform in the world, that was expected to raise more than SAUDI ARAMCO' debut raised in 2019 as the biggest IPO ever was to be a testimony of the world's transition from a century of in which crude oil was the most valuable resource to an era that prizes data. The financial market volatility, a 19th and early 20th century phenomenon, is back with all its political and even military solutions.

A brief history of the transition from MANAGERIAL CAPITALISM of nation states of the post-World War II institutionalized with the BRETTON WOODS AGREEMENT, to global ASSET MANAGER CAPITALISM, is presented to enlighten CHIMERICA's evolution (China+America), and President Trump's attempts to dismember CHIMERICA by promoting the emergence of a bipolar world to replace it with - TECHNOLOGY COLD WAR by weaponizing the interdependence of post-WTO global logistics system. President Trump's humbling of HUAWEI has begun a decoupling of Chinese and American IT infrastructures and of supply chains between China and America that is expected to continue. But China and America are not the only economies that matter in the contest between America and China. EU, Japan, Taiwan, South Korea and others all play crucial roles in the world's IT system – as do American and Chinese tech giants. All these entities, their national or corporate, are at odds with President Trump's initiative and often with each other. If these countries cannot agree on common rules in the digital realm, China could end up setting the rules for large swathes of the world, with initiatives like the DIGITAL SILK ROAD. The globally interdependent techno-sphere is shown as an enabled outcome of the implementation of WASHINGTON CONCENSUS of Anglo-American ASSET MANAGER CAPITALISM, that survived a comatose near death experience in 2007-2008 to emerge entrenched and consolidated for President Trump's Trade Wars. The battleground embraces money, technology and geopolitics, with the struggle fought out between industrial sphere of Chinese economy and intangible asset economy of Anglo-American finance. The central axis of USA/PRC competition runs through leading-edge technologies, Ai, 5G networks, digital money and quantum computing, each of which has the potential to reshape the geopolitical balance of power in economic, cybersecurity and military spheres. It helps to see the political world as one in which technology is beginning to look ever more like geography. The geopolitical way of looking at the world, which was born in the 19th century and revolutionized strategic thinking in the 20th, was based on the idea that the geographic aspects of the physical world could be crucially important to the relations between states. The units of analysis for today's nascent techno-politics are platforms: technologies on which other technologies are built – and alongside them, increasingly businesses, governments and ways of life. The platform of all platforms is the INTERNET forged by the 20th century geopolitical realities, to SPLINTERNET. Like geographical territories these platforms have their own politics. They have their own populations, mostly users, coders and other firms. They have their own laws, which lay out who can change code and access data. They have a position with respect to other platforms which underpin, compete with or build on them, just as territories have defined relationships with their neighbors.

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They have their own governance systems. Some are "open", others are "closed" and are run like absolute monarchies. The major warriors and battlegrounds of THE TECHNOLOGY COLD WAR are identified. Whether the next crisis will be another collapse of the global financial and economic system, or whether it will take the form of political or even military conflict, is impossible to say. Neither, seems, inevitable.
The text shows how GAIA THEORY sheds new light on economic growth, how fuzzy logic affects the national accounts, how accounting systems over-value the assets of publicly traded multinational companies balance sheets, and how network theory reveals the value of relationships, and argues that the economy needs to be viewed as a complex, chaotic system, as scientists view nature, not as an equilibrium seeking NEWTONIAN construct.

1.Mise en scene

In the self-regulating banking system, put in place with gramm-leach-blıley fınacıal servıces modernızatıon act that with president clinton's signature in 1999 repealed glass-steagall bankıng act of 1933 supported by FED's CHAIRMAN, Alan Greenspan's, Treasury Secretary Robert Rubin's and his deputy Larry Summer's well- orchestrated enthusiastic promotion and lobbying, more than 95% of money that are in the hands of the public are created by the private banking sector consists of bank deposits, and in the absence of a state-issued debt-free money, money needed for an economy to function, has to be borrowed from the banking sector, and hence the lender of last resort, the Central Bank when liquidity dries. The new legislation accelerated the concentration among US financial firms and further weakened FED's control. In 2020, more than three-quarters of American financial assets are controlled by ten largest financial conglomerates, not only too-big-to fail, but also too-interconnected-to fail. Yet, as recently as 1990, the then ten largest firms controlled barely 10%. As L. Randall Wray explains in Modern Money: A Prımer On Macroeconomıcs For Sovereıgn Monetary Systems (Wray, 2012) that money is loaned into existence on the condition that it will be paid back with interest. In other words, money is created in such a way that its very existence pushes the economy to grow. Money created by fractional reserve banking is not neutral with respect to growth. It is a growth pusher. For all those loans to be paid back with interest the borrower must make the money grow by a rate at least as high as the rate of interest. In addition to pushing growth, fractional reserve banking reinforces both booms and busts, making the economy more unstable than it would be with a more constant money supply controlled by the state as public service. Banks do not create legal tender; only governments can do that. But banks do create debt and customary means of payment.

"These dual views of banking mechanics reflect the dual nature of the medium of exchange in the current monetary framework. Today we have two primary media of exchange, namely government-issued fiat base money and bank-issued checkable deposits. The textbook story puts primary emphasis on base money: base money constitutes the "funds" that go into and out of commercial banks. By contrast, the Keynesian story puts the focus on deposits: deposits are the "funds", and are issued by commercial banks." clarifies Morgan Ricks in The Money Problem: Rethınkıng Fınancıal Regulatıon (The University of Chicago Press, 2016) and adds, "I argue that our modern policy response to panics – basically a standing commitment of public support for financial sector's short-term debt – may in fact be a major source of "debt-fueled bubbles", "credit booms", "overleverage" or whatever one chooses to call it. In other words, such excesses might be largely a product of our defective approach to fighting panics. The paramount objective should not be to prevent financial crises in some generic sense, but to prevent panics, which are a pathology of short-term debt. In other words, financial instability is mostly about private money. In fact, it always, has been." (The University of Chicago Press, 2016) "The historical progression of US banking regulation has been one of increasingly affirmative measures to prevent defaults on banks' monetary liabilities. This historical evolution culminated in a public-private partnership approach, the establishment of which led to an unprecedented period of stable, panic-free conditions. It was only with the emergence of shadow banking – private money creation outside the insured banking system that instability returned." (The Chicago University Press, 2016)

It was under Greenspan's regulatory reign, shadow banking reached its unprecedented heights and in a year after he left the helm the shadow banking started bringing the global financial system down. "The problem is that (under Greenspan's watch) the global financial system has moved from retail bank-based credit provision to wholesale market-based provision, where the source of liquidity is the repo rather than the bank deposit, and where gross funding, i.e. refinancing and debt rollovers, dominates net credit provision, i.e. new financing. Digging into the detail contained within the international balance sheet reveals that the bulk of cross-border capital movements are speculative portfolio flows and bank financing flows, not foreign direct investments (FDI). And, although capital appears to be exported from high savings Emergent Market economies to a few advanced economies with relatively slow domestic demand growth, the reality is different. Gross balance sheet analysis shows large-scale bank and portfolio flows heading into these risky Emerging Markets, with slightly larger amounts flowing back into deeper capital markets located in the large money centers of New York, London and Frankfurt, and often in search of "safe" assets. In other words, risk-seeking capital enters and risk-averse capital leaves. What is more, the former tends to be more long-term in nature than the latter. Neoclassical economics also misses the importance of this gross funding dimension, because it takes every credit as debt (debit), every debt as a credit: so assets and liabilities must match and the system always balances to zero, by definition. Thus, it never acknowledges neither the character of these flows nor how big these gross numbers are regardless of how much credit or debt there is in the system, the net figure is always the same." points out Michael J. Howell in CAPITAL WARS: THE RISE OF GLOBAL LIQUIDITY (The Author(s), 2020) and adds, "modern finance has inevitably geared itself towards refinancing existing debts, rather than continuing to provide new credit. Thus while shadow banks are typically involved in two-thirds of funding, e.g. 're-packing' of existing loans, they supply only 15% of new credit, according to IMF estimates. What shadow banks essentially do is to transform traditional bank assets and liabilities by refinancing them in longer and more complex intermediation chains." (Author(s), 2020).

Greenspan, the maestro, was replaced by Bernanke in 2006 to manage the crisis that started to unfold in 2007. The fragility of the financial system was disastrously evidenced in the 2007-2008 financial crisis. "When the crisis hit, the world came to realize that, rather than spreading the risk, securitization had led to the concentration of risk in the banking system itself. This crisis revealed the close interlinkage between the banking system and a complex system of credit intermediation that had formed outside of banking regulation – the shadow banking system. The latter system, in effect, experienced a situation analogous to a bank run, which is the sudden and self-reinforcing withdrawal of funds the system that requires fire-sale liquidation of assets. The return of impaired, "toxic" assets on the balance sheets of banks from the shadow banking system impacted them heavily, contributing to the $2.6trillion of losses concentrated in the banking sector." wrote Matthias Thiemann in the growth of shadow bankıng: a comparatıve ınstıtutıonal analysıs. (Thiemann, 2018).

"This shadow banking system was a network of activities engaged in credit intermediation outside of banking regulation, where the banks were centrally involved. It was based on a symbiosis between banks, broker-dealers, asset managers, and little capitalized off-balance-sheet entities that had formed over the course of the last thirty years, beginning in the USA under Greenspan's watch. This network was highly dependent on liquid wholesale funding and global debt markets and was the outcome of the adaptation of banks to the competitive challenges they faced from investment banks, money market mutual funds, and the easier capital market access for many of its clients. Rather than merely fighting their new competitors, banks sought to adjust their business models to integrate capital markets and these new rivals for deposits, such as money market mutual funds, into their own activities. They facilitated access to capital markets for their clients and tailored products to the new large institutional investors (such as pension funds, asset managers, and money market funds). They did so through an elaborate network of financial intermediaries, often off-balance-sheet, that were refinancing themselves in the wholesale markets. These shadow banking activities of banks would usually produce only low margins for the banks involved, thereby increasing the need to trade in high volumes." (Thiemann, 2018).
"Reforms after the 2008 crisis in the United States, the United Kingdom, and the European Union have tackled the safety of banks, but they have put few if any brakes on the drive to mint private money." writes Katharina Pistor in the code of capıtal: how law creates wealth and ınequalıty (Pistor, 2019) "When it comes to debt markets, the mantra of free markets is flatly wrong. The question is not even about regulation or de-regulation.

At heart, all these assets (private money) are simple IOUs - promises to pay a certain amount at some future date. Such promises can be based on personal relations, or they can be framed as binding legal commitments. Cloaking them in the modules of code of capital turns them into financial assets that are attractive for investors. Property and collateral law establish priority rights; trust and corporate law partition assets and shield them from too many creditors; and bankruptcy law can be designed to give some debt minters a head start over others, even if they never contracted or paid a premium for it. Debt, the private money that has fueled capitalism since its inception, is coded in law and ultimately relies on the state to back it up. States should realize this and keep the inflation of private money under control, because the more they bend to the will of private debt minters in boom times, the more money will be on the hook when it turns out that the economy cannot sustain the debt burden they created." (Pistor, 2019), and she adds, "They are all coded in law and exist only in claims that are carefully crafted in private, not in public law, but private law rests ultimately on state power; without the modules of the code of capital, these instruments would not even exist." (Pistor, 2019). "Fundamentally, capital is made from two ingredients: an asset, and the legal code. With the right legal coding assets can be turned into capital and thereby increase its propensity to create wealth for its holder(s)." (Pistor, 2019) "The legal devices used for coding assets are contract law, property rights, collateral law, trust, corporate, and bankruptcy law." (Pistor, 2019). "Global capital exists and thrives without a global state or a global law. The explanation for this is that law has become portable; it is possible to code assets in the modules of one legal system and still have them respected and enforced by courts and regulators of another country. In this way, a single domestic system could sustain global capitalism; in practice there are two that dominate it, English and New York State law." (Pistor, 2019).

After the implosion of NASDAQ's dot.com bubble in March 2000 that the GREENSPAN PUT – the long-standing belief among many US investors that Greenspan was able to propagate that Greenspan's FED will cut interest rates in order to prop up securities' prices if they fall too much - was instrumental in inflating, Greenspan kept the benchmark price for money below 2% for too long at the beginning of 21st century, and thus enabled the residential real estate bubbles in the United States and in different scales in various parts of the world, and in 2007 the real estate bubble collapsed in the United States ushering in a full blown global financial crisis in 2008, and that led to massive bailouts of the global financial system by their central banks and by their governments.

During the 19 years (1987-2006) Alan Greenspan was at the helm of monetary policy, at every opportunity he had to address the law makers at the CAPITOL HILL, he lectured them on how unimpeded competitive markets deliver optimal welfare, and that the financial institutions which create money, and through which money is allocated, have no independent effect on the real equilibrium of the economy, but are only acting on behalf of well-informed sovereign consumers. Meanwhile, during his reign at unprecedented numbers Wall Street apparatchiks rewarded each other never before seen bonuses for the profits they made from NASDAQ's dot.com bubble - an outcome of greenspan put – that Greenspan called "irrational exuberance", and "irrational exuberance" jump-started the intangible economy. Just as the bubble began to burst, Robert J. Shiller published Irratıonal Exuberance (Shiller, 2000)[1] besides emphasizing the role of psychological factors he pointed cyclically adjusted price-to-earnings ratio (CAPE) to have reached 45, the highest value ever recorded. Before the dot.com bubble, its highest-ever value had been 33, on the eve of the 1929 CRASH. "In December 1990, the technology component of the S&P was only 6.5%; by March 2000 it was over 34%. By July 2001, it was about 17%.", wrote hal r. varian, joseph farrell and carl shapiro in the economıcs of ınformatıon technology: an ıntroductıon (banca ıntesa, 2004). Nassim nicholas taleb in the black swan: the ımpact of the hıghly ımprobable in the year greenspan left fed, summarized the financial system greenspan's systemic risk regulatory regime left behind. "We have never lived before under the threat of a global collapse. Financial institutions have been merging into smaller number of very large banks. Almost all banks are now interrelated. So the financial ecology is swelling into gigantic, incestuous, bureaucratic banks (often Gaussianized in their risk measurement) – when one falls, they all fall. The increased concentration among banks seems to have the effect of making financial crisis less likely, but when they happen they are more global in scale and hit us very hard. We have moved from a diversified ecology of small banks, with varied lending policies, to a more homogeneous framework of firms that all resemble one another." (Taleb, 2007). Nassim Nicholas Taleb in black swan: the ımpact of the hıghly ımprobable (taleb, 2007) and benoit mandelbrot in the (mıs)behavıor of markets: a fractal vıew of fınancıal turbulence (Mandelbrot, 2004)[1] question the use of volatility as a risk measure and highlight the implicit absurdity of using the GAUSSIAN "normal" probability distribution(or bell curve) to model risk events.

"We have unknowingly created a complex adaptive financial system that we do not understand and cannot control. At each stage of its creation, we accrued additional complexity in the name of added benefits: connecting markets with one another will ensure that price discrepancies will be eliminated quickly, having hıgh frequency traders (hft) will guarantee a ready trading partner for any transaction, using derivatives will provide a means for farmers to hedge the risks of bad weather and for pension funds to insure their portfolios, and so on. while each of these individual piece makes sense, the collection may not. … the 5/6/2010 flash crash occurred not by design but through emergence." adds john h. miller in a crude look at the whole: the scıence of complex systems ın busıness, lıfe, and socıety (Miller, 2015).

Most of the law-makers, from the ways they voted, seemed to have bought in Greenspan's official storyline, even when, Greenspan's official storylines were in stark contrast to the radical structural transformations of the banking system as the bundling of Wall Street and commercial banking under cıtıgroup's roof, speedy development of shadow banking, and the new york stock exchange's transformation from a relatively transparent mutual of 600+ unlimited partnerships of about equal size to profit seeking oligopolies of

broker-dealer owned dark pools of fragmented markets served by proprietary high-speed computer trading firms as explained by Walter Mattli in Darkness By Desıgn: Hıdden Power In Global Capıtal Markets (Princeton University Press, 2019).

Financial markets are now overwhelmingly automated. Almost all trading messages submitted to equity markets are sourced from an automated order processing system. While those who invest on business fundamentals have different motivations, and behave differently from short term traders, many of the execution tools and algorithms used by short term traders are also used by large fundamental investors. Hıgh Frequency Tradıng (HFT) is a subset of algorithmic trading with shortest holding time, the smallest positions and greatest frequency. In addition to HFT, there is a growing volume of other forms of technical trading. HFT are a diverse group with short-term and speculative profit-driven strategies.

After 200 years of not-for-profit, member-owned U.S. exchanges have transitioned to a for-profit model that has proven itself to be costly to investors, unfair to broker-dealers and rife with conflicts for the exchanges themselves. The exchanges geared to serve their shareholders had evolved to favor the high-frequency trader. Institutional investors moved into dark, opaque pools. In 2007, the NYSE launched a $500million initiative, PROJECT ALPHA, building a mammoth computer trading facility in Mahwah, New Jersey. With PROJECT ALPHA high-frequency trading had officially taken over the BIG BOARD. While the floor remained open for business, it was a shadow of its former self, a puppet show for TV as the NYSE share of trading fell to about 20% from 70-80% explained Scott Patterson in dark pools: the rıse of the machıne traders and the rıggıng of the u.s. Stock market (Patterson, 2012). According to The ECONOMIST[1], US equities trading market shares 5-day average to September 25, 2019 for Off exchange was 36%; NYSE was 21%; NASDAQ was 20%; CBOE was 19%; IEX was 4%. CBOE focuses on exchange-traded funds. Michael Lewis in Flash Boys: A Wall Street Revolt (Lewis, 2014, 2015) cast IEX as champions of ordinary investors against rigged markets with fair and simple fees. IEX also routes orders over a 'speed bump', a coil of fiber-optic cable that slows access to the market by 350 microseconds. By 2020 markets from Toronto to Moscow declared their intentions of using some sort of speed bumps championing the average investor.

Intercontınental exchange owns various financial markets platforms including the New York Stock Exchange (NYSE) was set up in 2000 to run a commodity-features exchange and in 2020 runs 12 exchanges world-wide and operates six clearing-houses that manage counterparty risk for financial transactions. Since buying NYSE in 2013, it revamped its trading platform and renovated its historic headquarters.

Trading in 2019 in US equity markets is split between 12 public exchanges and many more off-exchange trading venues, including about 40 'dark pools' that match buy and sell orders but do not display quotations and over 200 internalizing broker-dealers. This fragmentation is a feature not only of equity markets but also of other markets, including options, markets and FOREIGN EXCHANGE (FX) markets. UBS, CREDIT SUISSE, DEUTSCHE BANK, and BARCLAYS provided 43.5% of internalized dark pools of NEW YORK STOCK EXCHANGE in April-June 2016. The rest were provided by Morgan Stanley, JPMORGAN, Cıtıgroup, Bank of Amerıca Merıll Lynch, and Goldman Sachs. Dark pools are trading platforms that match buy and sell orders but do not display quotations. Dark pools report trade price and quantity after executing a trade.

They enable institutional investors to buy and sell large orders of stocks, block orders, away from the publicly quoted market with minimal information leakage and price impact. Fragmented capital markets and their high frequency and algorithmic trading are a growing reality in Europe as well as parts of Asia. In this hyper-fast fragmented global marketplace, algorithms battle algorithms for trading dominance, preferential trading execution, and most sophisticated trading supercomputers deal not only in securities but increasingly across assets classes, including futures, fixed income, currencies, and commodities, and across hundreds of markets and dozens of countries. Global algorıthmıc capıtal markets: hıgh frequency tradıng, dark pools, and regulatory challenges (Oxford University Press, 2019][1], edited by Walter Mattli shows how frenzied activity of traders on the trading floors of New York, London and Chicago has been replaced by algorithmic trading and supercomputers in gigantic data centers connected by proprietary fiber optics and microwaves became extraordinarily complex and opaque measured in milliseconds and microseconds beyond human perception. At the end of World War II, the average holding period for a stock was 4 years. By 2000, it was 8 months. By 2008, it was 2 months. By 2011 it was 22 seconds.

Gregory Zuckerman in The Man Who Solved The Market: How Jım Sımons Launched The Quant Revolutıon (Zuckerman, 2019] claims that "quant investors had emerged as the dominant players in the finance business. As of early 2019, they represent close to a third of all stock-market trades, a share that had more than doubled since 2013. Already, hedge-fund firm two sıgma has built a computing system with more than 100 teraflops of power – meaning it can process 100 trillion calculations a second- and more than 11 petabytes of memory, the equivalent of 5 times the data stored in all academic libraries. In June 2019, RENAISSANCE, managed a combined $65billion, making it one of the largest hedge-fund firms in the world, and sometimes represented as much as 5% of daily stock market trading volume, not including high-frequency traders," (Zuckerman, 2019].

In the first half of the first decade of 21st century, Alan Greenspan faced 4 challenges. The first was mostly his making, the bursting of the dot-com stock bubble in March 2000. Second was a cyclical recession beginning in March 2001, part of a slowdown in developed economies. Third were the 9/11 attacks that caused $40billion in insurance loss and a one-day 7.1% stock market decline that followed the longest trading suspension, 9/11-14, 2001 since 1933. Fourth, China's accession to full World Trade Organization (WTO] membership in December 2001 that opened world markets to the greatest agglomeration of cheap labor and abundant capital in history putting downward pressures on global prices that has not abated. Greenspan, to fight central bankers' nightmare, deflation, held FED FUNDS effective rate below 2% until November 2004, now criticized as "too low for too long". Low rates provided the funding for the housing bubble and subprime mortgage crisis that imploded in 2007. The following year saw the global financial crisis and near destruction of the banking sector and the international monetary system.

By holding the FED FUNDS RATE below the rate of inflation for 3 years, Greenspan virtually made a free gift to providers of home mortgages when the US government had already greased the housing industry by making mortgage interest tax deductible and eliminated most capital gains taxes on homes. Furthermore, the US government had also provided loan guarantees through the Federal Housıng Admınıstratıon (FDA] and its own cheap mortgages through both the Federal Home Loan Banks and the private/public entities (FANNIE MAE] and (FREDIE MAC]. By the end of 2007, the government sponsored mortgages accounted for 81% off all the mortgage loans made in the US., and by 2010 this had risen to all. Hunter Lewis in Crony Capıtalısm ın Amerıca: 2008-2012 (AC Books, 2013] provides a detailed summary.

"During the 1990s, Americans had boosted their disposable income by about 2-3% each year by tapping the wealth in their homes. This mostly came from capital gains when homes were sold, rather than from additional borrowing. Between the start of 2004 and the middle of 2006, however, home equity withdrawals boosted Americans' disposable income by 10% about $1trillion in each year. Over the course of the entire bubble, from the start of 2002 through the end of 2007, Americans extracted $4.7trillion in wealth from their homes. The corresponding debt boom explains why Americans' housing wealth rose by less than $2trillion at a time when US home values increased by roughly $7trillion. It also explains why so many Americans had a negative saving rate during the 2000s: from their perspective, rising home prices were effectively saving for them, freeing up cash from their meager wages to buy more goods and services By the middle of 2008, Americans had stopped taking money out of their homes altogether. Despite the explosion of mortgage debt, America did not experience an economic boom. It was not Greece or Ireland or Spain. As in Germany, sharply higher inequality, anemic corporate spending, and relatively tight fiscal policy all dampened US domestic demand. Private fixed investment spending net of depreciation and inflation remained below the 2000 peak until 2014. There was no consumption boom, either. Real household consumption spending per person grew slightly slower in 2000-2006 than it did in 1947-2000. Private sector employment fell by 3% between 2000 and 2003 and never grew enough to keep pace with the expanding population. Inflation was so moribund that the Federal Reserve was worried about falling prices." inform Matthew C. Klein and Michael Pettis in trade wars are class wars: how rısıng ınequalıty dıstorts the global economy and threatens ınternatıonal peace (Klein and Pettis, 2020).

During Greenspan's reign, the forecasting models of the treasury and the FED lacked a financial sector. In the country where separation of power is written in their constitution, the econometricians of federal government must have bought the Maestro Greenspan's story line based on neoclassical economics theory as the law makers did, and modelled the US economy without a financial sector. The story line's assumption was that future prices would move in line with current expectations removed any need to take precautions against financial collapse, despite a continuous history of financial manias and panics. Aiming to minimize regulation, dynamıc stocastıc general equılıbrıum models of the economy ignored the financial sector and thus did not make the distinction between economic recession and financial asset price declines blurring the distinction between economic recessions and financial market downturns. The emerging new financial order under Greenspan's watch was kept off the radar screens of the econometricians who were responsible for modelling the US economy. The behavior of financial markets is not, as is commonly believed, some function of the economy. It is a manifestation of the rise of carry, and suppression of financial volatility. The rise of carry trades can be understood as part of a broader phenomenon. Carry trades are financial transactions that produce a regular stream of accounting profits by subjecting the owner to the risk to a sudden loss when underlying asset values change substantially. In this sense, carry trades are closely related to selling insurance, an activity that provides a steady premium income but exposes the seller to occasional large losses. The carry traders perform two functions: the function of assuming risk as insurers do and the other is providing market liquidity as market makers in financial markets do. The classic carry trade takes place in foreign exchange market, when a trader borrows in a low interest rate currency and invests the proceeds in higher yielding currency. The world of currency markets can be broken down into low interest rate currencies that tend to be "funding currencies" – currencies that are attractive to borrow in to finance carry trades –and high interest rate currencies that are "recipient currencies– currencies that seem attractive to invest in to benefit from their high interest rates.

Bank of Japan was the first central bank to bring short-term interest rates to near zero in early 1990s to deal with the aftermath of 1989 bursts of their stock and real estate bubbles. Thus, in the earlier years the rise of currency carry trade was yen-funded. For currency carry trades, there are two sides to a currency exchange rate, and if a carry crash means a crash of carry recipient currencies, it is also likely to mean a "melt up" in the value of the funding currency. The "melt up" of the yen that occurred in October 1998, at the end of Russian and South East Asian crisis with the 15% collapse of the dollar against the yen, a pivotal moment in the rise of carry trade. "Alan Greenspan directly expressed his concerns about the sharp widening of credit spreads that marked the 1998 carry crash and implemented a surprise rapid easing of US monetary policy that featured three consecutive interest rate cuts within two months, over September to November 1998. The US economy at the time was very strong and in no way justified cuts in interest rates from what were already quite low levels. By doing this, the FED, for the first time, made explicit that it viewed the stability of financial markets and, in particular, the level of credit spreads to be an express responsibility and priority of the central bank. That decision has colored all market behavior since it laid the groundwork for successively bigger carry bubbles. The knowledge that the FED and, by influence, other central banks stand behind them has made carry traders more confident in their levered bets on low financial volatility. In 2002, despite Japanese short-term interest rates at virtually zero, the yen had begun to appreciate in the foreign exchange markets again. … Over a period of seven months BoJ accumulated well over $250billion in foreign reserves in the attempt to prevent the yen from appreciating." write Tim Lee, Jamie Lee, and Kevin Coldiron in the rıse of carry: the dangerous consequences of volatılıty suppressıon and the new financıal order of decayıng growth and recurrıng crısıs (The McGraw-Hill Ed., 2020).

Greenspan's first suppression - GREENSPAN PUT - however was on October 19, 1987, Black Monday. The apparent efficacy of Greenspan's actions in 1987, just a few months after his confirmation, arguably could have laid the foundations for the carry regime to develop subsequently. Greenspan sent a strong signal to speculators that FED was standing behind them. The experimental monetary policies of central banks involving their willingness to expand their balance sheets to support financial markets with FED's quantitative easing policies to the ECB's "whatever it takes" approach followed. The central banks' quantitative easing is itself a carry trade. The central bank buys higher-yielding debt instruments and finance these purchases by issuing its own low or zero-yielding liabilities (high-powered money of which it is the monopoly supplier). The mispricing of risk is less to do with incorrect mathematical calculations about risk correlation and more to do with the reality that risks of loss are to be absorbed by the public at large while the rewards are to accrue to financial speculators. Tim Lee, Jamie Lee, and Kevin Coldiron add, "Our aim is to convey how the expected return from carry, or volatility-selling, trades is embedded in the structure of volatility and returns in the US stock market. This can be interpreted as a requirement for the market to provide a return to carry traders to compensate them for being providers of market liquidity. A world in which there is more leverage – condition that certainly applies to today's world – is a world in which the premium for selling volatility should be greater. This means high returns to carry trades, albeit punctuated by carry crashes. The interventions of central bank, in which the central banks take on the role of giant carry trades themselves, create a carry regime with much larger carry bubbles and carry crashes; during the carry bubbles, risks become seriously mispriced." (McGraw-Hill Education, 2020). The authors point out that, "One consistent feature of the S&P 500 over the past 30 years is that the market volatility has systematically differed between measurement, or replication, horizons. Specifically, volatility is higher at shorter horizons such as one day than at longer horizons such as one month. This means that it is profitable to sell realized gamma at higher volatility, shorter, horizon – and buy it back at lower volatility, longer, horizon. The profit from a strategy that sells one daily realized gamma and buys one monthly realized gamma, as described above, is directly proportional to the difference between the daily variance and the monthly variance – that is, to daily volatility squared minus monthly volatility squared." (McGraw-Hill Education, 2020) The observation that daily volatility exceeds monthly volatility implies that returns are mean reverting, Large short-term moves in one direction are likely to reverse partially over longer horizons.

The authors conclude, "The expansion of carry trades by central banks makes them, for a time, excessively profitable, and more capital is drawn into them. At some point this depresses the prospective return to carry enough to bring about a severe carry crash. But the cycle of carry bubble and carry crash is associated with ever-greater leverage in the financial markets and in the economy. More leverage means a structure of volatility that further incentivizes carry – and carry regime goes on. This carry regime then determines the course of the economy: creating a pattern of economic growth driven by consumption and capital allocation driven by speculation, as opposed to a more healthy economy driven by the investment of the economy's savings in future growth potential. Given the accompanying background of excessive leverage and debt, this is something for which the world economy will be paying for a long time." (McGraw-Hill Education, 2020). "Carry – in its financial and extreme sense – is about extracting an income from the authorities' own monopoly power, specifically the central bank's monopoly over the supply of money and the government's power to tax. In a subtle way this involves what is usually referred as "regulatory capture". This is the situation in which the regulator – in this case the government or the central bank – which is supposed to act in the public interest, ends up mostly acting in the interests of the regulated, in this case the financial industry, particularly speculative finance." (McGraw-Hill, 2020)

Greenspan with the enthusiastic lobbying of Lawrence Summers, Robert Rubin and Arthur Levitt was able to convince the law-makers to liberate finance from regulations and down-size whatever regulators were left, and within a decade liberated finance span out of control, and imploded. But few months before the 2007-2008 implosion, Dick Chaney's and George W. Bush's Whitehouse, with impeccable prophesy, put a very competent economic historian schooled in Milton Friedman's and Anna J. Swartz's a monetary hıstory of the unıted states sınce 1867-1960 (Friedman and Swartz, 1971), a play book for central banks on how to manage financial crisis, showing the central bank's management of the 1929 implosion as the wrong play-book, in charge of FED, Ben Bernanke. Bernanke's academic reputation was grounded in his study of the Great Depression, particularly the pivotal year of 1933, when Roosevelt succeeded Hoover as president of the United States.

The 2007-2008 Financial Crisis started with some homeowners having bought homes they could not afford found it hard to make their monthly mortgage payments in some locations in the United States, and graduated into a first run on a British bank, northern rock, in 150 years. This inherent market instability was compounded by the financial regulators' failure to understand the built-in dynamics of banking networks. Before the crash, those regulators with Alan Greenspan's assurances worked on the assumption that networks always serve to disperse risk, and so the regulations that they devised only monitored the nodes in the networks - individual banks - rather than overseeing the nature of their interconnections. The loose US monetary policy spilled over through cross-border flows into similarly relaxed local monetary conditions across many Emerging Market economies and allowed cash to build up in offshore Eurodollar funding markets. Overseas financial institutions issued, and they still do in 2020, huge amounts of dollar-denominated cash equivalents called Eurodollars. They are often issued to US-based institutions, and bulk of the proceeds is typically invested back into the US credit markets. It involves issuing cash equivalents that are denominated in dollars, but it takes place outside the reach of US monetary and banking authorities. "Eurodollars reached a peak of $4.9trillion in 2007, making Eurodollars the single largest category of dollar money-claims on the eve of the financial crisis – bigger even than insured deposits ($4.3trilllion) and short term repo ($4.1trillion). Like the rest of the private money markets, the Eurodollar market saw severe stress during the financial crisis. In response, the Federal Reserve provided a staggering $583billion (peak level) in US dollar loans to foreign institutions to support their short-term dollar funding. It provided this support indirectly, through liquidity swaps with foreign central banks." wrote Morgan Ricks. (The University of Chicago Press, 2016)

Money flows across frontiers, but laws do not. When representatives of the Allied powers met in Bretton Woods, New Hampshire, in 1944 to design the post-war financial architecture, they had a keen awareness of the danger posed by the flow of uncontrolled money, and the power it had to spread instability and damage democracy. The system that the Allies created did not last as long as its creators hoped, and it was frequently criticized during its lifetime for, among other things, the high tax rates the participating governments imposed, but its achievements look remarkable in retrospect. Between 1948 and the early 1970s, the world enjoyed progress and stability never rivaled since and before. The world's GDP expanded by an 2.8% per annum, more than the equivalent rates for the preceding and succeeding periods. There was not a single global recession during those years. Since the system collapsed with Nixon's abandonment of the dollar's peg to gold in 1971, there were four.

Achieving the goal of Bretton Wood's participants of locking speculative money behind national borders failed with the profusion of anonymous money made possible by Siegmund Warburg, a London banker, "Warburg's bond issue became known as "Eurobonds" paying a highly convenient bond paying a good rate of interest, on which no one had to pay tax of any kind, and which could be turned into $cash anywhere. It was the ultimate expression of offshore. These were what are known as "bearer bonds". Whoever possessed the bonds owned them; there was no register of ownership, or any obligation to record your holding, which was not written down anywhere. Before Eurobonds, hidden US$ wealth in Switzerland couldn't really do much; but now it could buy these fantastic pieces of paper, which could be carried anywhere, redeemed anywhere, and all the while paid interest to their owners, tax-free. Dodge taxes and make profit: they were like $1000 interest-paying travelers' checks. This then, was the moment when the first rich people unlocked the door to Moneyland's magic garden; the moment when clever London bankers conjured into existence a virtual country where, if you were rich enough, whoever you were, wherever your money came from, the laws did not apply to you. In the second half of1963, $35million of Eurobonds were sold. In 1964, the market was $510million. In 1967, the total passed a billion dollars for the first time, and it is now one of the biggest markets in the world. Even American companies abandoned New York, with its tiresome regulations and started issuing Eurobonds, though this meant new moves in the game of Twister required to dodge government attempts to keep some kind of control on the surges of hot money. This then, is the origin of the inevitable tension between borderless money and bordered states." informed Oliver Bullough in moneyland: the ınsıde story of the crooks and kleptocrats who rule the world (Bullough, 2019). "Offshore" – being legally absent while physically present – is the apt term that describes such financial transactions.

In 2010, Congress passed the foreıgn account tax compliance act (FATCA).

"European countries agreements to swap information with each other; and various British tax havens agreements to exchange data with UK culminated in common reportıng standard (CRS), under which countries agreed to automatically swap information about the assets that each other's residents hold in each other's banks. Previously, countries had exchanged information, but only on requests, which meant tax authorities had to know what they were looking for before they looked for it. The agreement threatened to stymie the most potent motivating force behind Moneyland, the fact that law enforcement stopped at national borders, but money did not. The new regulatory regime, in which tax authorities automatically exchange information with each other, has a structural weakness. CRS involves – as an aspiration, if not yet as a reality – everyone exchanging information with everyone else. But the United States is not part of CRS; it has its own system. Unlike CRS, FATCA, the US law that first broke the back of Swiss secrecy, only works in one direction. Financial institutions from more than 100 countries have to share information on assets held by US citizens or residents; but US institutions don't have to send anything back in return. US institutions will be fully informed about what's going on elsewhere in the world, but their counterparts in other countries will be completely blind as to what's happening in the United States." (Bullough, 2019.) "The United States had bullied the rest of the world into scraping financial secrecy, but hadn't applied the same standards to itself. …. The reasons for why this happened are complicated, and partly stem from differences in ways different countries administer taxes."(Bullough, 2019) .

The crash made clear that a network's structure can be robust-yet-fragile, as Nassim Nicholas Taleb explained in Antıfragıle: thıngs that gaın from dısorder (Taleb, 2018). Network structure usually behaves as a robust shock-absorber, but then its positive feedback -as the character of the network evolves – switches it to become a fragile shock-amplifier. And, that caused 5 pillars of American finance to vanish in 2008. "In the wake of the 2008 global financial crisis, governments around the world sought to restructure their existing regulatory framework and introduce new regulations with the aim of both curtailing the excesses that lead up to the crisis and preventing future crisis. The result has been the US Dodd-Frank ACT, over 2300 pages that includes thousands of other pages filled with detailed rules. The resulting effect is the creation of a system that has been both extremely expensive and not particularly effective. In the United States alone, banks collectively spend more than $50billion each year on anti-money laundering (AML) compliance. However, in spite of this expenditure, global money laundering transactions are estimated to total $1-2trillion a year, with less than 1% seized by authorities." write Henri Arslanian and Fabrice Fischer in the future of finance: the ımpact of fıntech, ai, and crypto on fınancıal servıces.(The Author(s), 2019).

At FED, Greenspan's predecessor, Ben Bernanke's first step was to lower the interest rate and lengthen the term on direct loans to banks from the FED's dıscount wındow. As commercial banks were slow to respond, and as the liquidity situation worsened, FED announced the creation of term auctıon facılıty to make loans at its discount window cheaper and anonymous. Institutions that posed systemic threats included not only commercial banks but also, if not primarily, investment banks as well as mortgage and insurance groups. They were desperately short of capital after decades of astronomical bonuses awarded to ever growing number of Wall Street apparatchiks. Investment banks' funding base has been most volatile without access to retail deposits last two decades before 2008. Their assets tended to be very risky while engaging in huge volume of transactions among themselves, with hedge funds, and with commercial banks. In 1980 financial sector debt was only 10% of non-financial debt. In 2008 it stood at 50%, turning investment banks into machines that trade heavily with each other and reported handsome profits that justified the bankers' astronomical bonuses, bankers received and kept.

Leverage ratios in the banking industry out-competed those of hedge funds. "The average hedge fund borrows only one or two times its investors' capital, and even those that are considered highly leveraged generally borrow less than ten times. Meanwhile investment banks such as Goldman Sachs or Lehman Brothers were leveraged thirty to one before the crisis, and commercial banks like CITI were even higher by some measure." informs Sabastian Mallaby in more money than god: hedge funds and makıng of a new elıte (Mallaby, 2010). Neither were governments themselves, and for that matter the national economy, free of leverage. Summing up federal, state, local government, company and household liabilities: for every productive $1 there were $ 3.7 debt in 2008. It became clear in retrospect after 2008, that debt financed transfer of wealth and US GDP growth for many years prior to 2008 was not sustainable.

In the immediate aftermath of the global financial crisis, all of the major central banks served as lenders of last resort in order to maintain functional settlement systems. Monetary easing via massive central bank injections of reserves was assumed to be essential to overcome the financial crisis, when lenders were immobilized by non-performing loan problems. Emergency lending was made to banks, and currency swap agreements were drawn up with 14 different countries in order to ensure that they had access to the dollars they needed.

The most important outcome, however, was that key interest rates across the world dropped precipitously. US FED FUNDS TARGET RATE went from 5.25% in August 2007 down to 0.25% target by December 2008. Likewise Bank of England dropped its primary interest rate from 5.0% in October 2008 to 0.5% by March 2009. October 2008 saw the crisis intensify, which led to an internationally coordinated interest rate cut by 6 major central banks.

By 2016 monetary policy makers had dropped interest rates 637 times. As this continued through the post crisis period and established a low interest rate environment for the global economy, a key enabling condition for parts of today's digital economy began to arise. But at a price. The bailouts required governments around the world to rescue major global banks whose net worth had turned out to be fictitious, with the bailouts continuing to impose heavy social costs ten years on with imploded public debts, squeezed public budgets, heavy household debt and negative returns for savers.

"After the bankruptcy of LEHMAN BROTHERS in September 2008 and the ensuing financial panic, things changed completely, however. The world's major central banks devise increasingly complex money-creation schemes collectively described by the enigmatic term "quantitative easing" (QE). In concrete terms, (QE) involves lending to these banking sectors for longer and longer periods (three months, six months, or even a year rather than a few days or weeks) and buying bonds issued by private firms and governments with even longer durations (of several years) and in much greater quantities than before. The FEDERAL RESERVE was first to react. In September-October 2008 its balance sheet increased from the equivalent of 5% of GDP to 15%; in other words, the FED created money equivalent to 10% of US GDP in a few weeks' time. This proactive stance would continue in subsequent years: the FED's balance sheet had risen to 25% of GDP by the end of 2014; since then it had declined slightly, but it remains substantially larger than it was before the crisis (20% of GDP at the end of 2018 compared with 5% in mid-September 2008). In Europe the reaction was slower. …. Since then, ECB's purchases of public and private bonds have accelerated, however, and the ECB's balance sheet stood at 40% of Eurozone GDP at the end of 2018." observes Thomas Piketty in CAPITAL AND IDEOLOGY (The President and Fellows of Harvard College, 2020), and points out, "From a strictly technical standpoint, the FED or the ECB could create dollars or euros worth 600% of GDP and attempt to buy all the private wealth of the Unites States or Western Europe. But this would raise serious issues of governance: central banks and their boards of governors are no better equipped to administer all of a country's property than were the Soviet Union's central planners." (The President and the Fellows of Harvard College, 2020).

Over the period 2008-2014 in the United States, Bernanke's FEDERAL RESERVE embarked on three different QUANTITATIVE EASING schemes, totaling $4.1trillion. In the UK, the BANK OF ENGLAND undertook 375billion pounds of QE between 2009 and 2012, and in Europe, the ECB committed 60billion euros per month from January 2015 to March 2017. By the end of 2016, central banks across the world had purchased more than $12.3trillion worth of worthless 'assets'. The primary argument for using quantitative easing was that it should lower the yields of other assets. If traditional monetary policy operates primarily by altering the short-term interest rate, quantitative easing is expected to affect the longer interest rates and the yields of alternative assets.

Granted that the assets are not perfect substitutes for one another, taking away or restricting supply of one asset should have some effect on demand for other assets. In particular, reducing the yield of US government bonds should increase the demand for other financial assets and raise the prices of stocks and subsequently create stockholder wealth, provided that the biggest holders of US government debt, IMF mandated 'independent' central banks of the world, do not sell, better yet are not allowed to sell. While the evidence is still not definitive, it does seem that quantitative easing has had an effect. Corporate bond yields have declined and stock markets have surged upwards until September 2018. That may have had an effect on all sectors of the US economy as well by making much of the economic recovery depend on $4.7trillion of new corporate debt since 2007.

FED announced its plans in September 2017 for a gradual unwinding of its

$4.1trillion balance sheet that swelled during the previous decade as it engaged in quantıtatıve easıng to ease the pernicious effects of the global financial crisis. The plan was to set a path and proceed on autopilot. This it was hoped, would avoid the pace of unwinding being taken as a signal of the direction of interest rates. It would start slowly, just $10billion a month from October 2017, and smoothly pick up pace. By October 2018 it had quickened, as planned, to $50billion. That coincided with the start of a bout of market turbulence. The S&P 500 INDEX of leading shares fell by 14% in the final 3 months of 2018.

Bernanke's FED's expansion of balance sheet, in 2008, was announced to provide banks with liquidity they desperately needed; to signal to markets that monetary policy would remain loose for some considerable time, and to reduce the bond yields, encouraging investors to buy riskier assets. It came in three rounds. The first, QE1 ran from November 2008 through June 2010. The second, QE2 began in November 2010 and lasted until June 2011. The third, QE3 started in September 2012 and lasted until October 2014. As a result, base money supply, M0 in FED argot, increased from $800billion o $4.1trillion. The effects are still debated. Most agree QE1 was a proper response to the liquidity crisis that peaked with the Lehman Brothers bankruptcy on 9/15/2008. Some think that QE2 and QE3 were Bernanke's experiments with no historic precedent and uncertain outcomes.

Critics of QEs claiming that money supply explosion on this scale would produce massive waves of inflation were proven wrong. As Richard Koo in THE ESCAPE FROM BALANCE SHEET RECESSION AND THE QE TRAP: A HAZARDOUS ROAD FOR THE WORLD ECONOMY (Wiley, 2015)[1] explained both the investors and consumers were saving, paying off debt and rebuilding their balance sheets. There is an academic theory behind Bernanke's QEs, called the PORTFOLIO BALANCE CHANNEL. The idea is that investor money has to go somewhere. By purchasing long-term Treasury securities, the FED lowered their total return and made them less attractive to investors. In turn, this made stocks and real estate more attractive on relative basis. As investor funds flowed to equity and property channels, those assets would be worth more, and higher asset values would provide collateral for more borrowing.

By 2015, QE and zero-interest-rate policies ended. Critics were wrong about inflation and the FED was wrong about stimulus. Average growth in the US economy in 9 years after the end of recession in June 2009 was 2.2%, far below long-term trend growth, the weakest recovery in US history. Neither inflation nor the trend growth arrived. The ten-year episode of low interest rates and bloated balance sheets did not live up to the worst fears of critics or the great expectations of policy-makers. However, QE and zero rates did have one effect. It was the same effect Greenspan produced, dot-com and the real estate bubbles. Greenspan's real estate bubble was confined to mortgages. In contrast by late 2018, the bubbles were in equities, bonds, high-end real estate, emerging markets and Chinese credit.

How to unwind trillions of dollars of QEs without sending bond yields or exchange rates to damagingly high levels is the biggest challenge facing monetary authorities in the West and Japan. Proponents of QEs have emphasized their initial benefits while ignoring the potential high costs involved in mopping up the excess reserves later on. In comparison to economies that did not implement QE, those that did will probably end up recovering more slowly because of their higher interest and exchange rates they will endure in getting out of the QE trap.

Between 2010 and 2017, US auto loans outstanding surged from $650billion to $1.1trillion, of which $280billion were subprime. In the same period, delinquent auto loans increased by $23billion. Corporate credit was in no better shape than consumer credit. As of 2017, US corporate debt outstanding stood at $5.9trillion and US dollar denominated debt issued by emerging market companies exceeded $9trillion in 2017 according to BANK FOR INTERNATIONAL SETTLEMENTS (BIS). These equity and credit bubbles were visible on bank and corporate balance sheets. The 5 largest US banks held $157trillion of derivatives measured by gross notional value at the end of 2017, a 12% increase from comparable amount of derivatives before 2008 financial crisis. The 12% increase is not the complete picture, because trillions of derivatives have been moved to third-party clearinghouses. Clearinghouses do not eliminate risk. They merely move risk around in ways that make it difficult to discern. Where derivatives are concerned, the financial system is not smaller, not safer, and not more sound.

"Growth has come at the price of a further buildup of household debt; persistently low to negative interest rates have led to a search for yield, fueling the growth of speculative bubbles in different asset classes, including property prices in global cities such as New York, London, and Paris. Investment banks, particularly in the United States, have reached new peaks of profitability riding a wave of leveraged loan buyouts financed by collateralized loan obligations, structured debt products once described as toxic. Now "nonbanks" have emerged and engage in lending to riskier, high-yield borrowers – while the banks stand behind financing tem. Overall, financialized capitalism, fueled by asset-led rather than demand-led growth, seems to have been restored and any intrusive change to finance averted. Arguably, this trend has been nowhere more evident than in the regulatory treatment of shadow banking, the provision of credit outside of banks' balance sheets but often involving banks after the financial crisis. In the current official discourse, shadow banking is rebranded as "market-based finance" and is to be turned into resilient market-based finance by vigilant regulators, allowing further diversification of funding resources in a financial system seen as too dependent on banks. Yet, in a glaring omission, no anticyclical regulations to contain booms emanating from that sector of the financial system have been created, nor are they forthcoming. It seems fair to say that we are witnessing a cyclical upswing, driven by finance, which if no regulatory intervention occurs, will likely lead to another crisis. But far that, the regulatory pendulum seems to have swung in favor of finance. This impression is reinforced by a US government seeking to undo much of the regulatory burden imposed after the financial crisis. As of October 2017, there are nineteen measures in front of US CONGRESS to revoke or lower post-crisis regulation." (Thiemann, 2018)

The most dramatic GREENSPAN PUT was in September and October of 1998 when he cut interest rates twice in three weeks, including an unscheduled emergency cut, to contain the damage from the collapse of LONG-TERM CAPITAL MANAGEMENT, a big American hedge fund. The Bernanke PUTs were exhibited on numerous occasions, notably the launch of QE2 in November 2010, after QE1 failed to stimulate the economy, and the September 2013 of a taper in the FED's long-term asset purchases in reaction to an emerging-markets meltdown resulting from mere "taper talk" in May 2013. The Yellen puts were when she delayed the first FED rate hike in nine years from September 2015 to December 2015 to calm markets after a Chinese currency devaluation and consequent US market meltdown in August 2015. Yellen put was used again starting in March 2016, when FED delayed expected rate hikes until December 2016 in reaction to another Chinese currency devaluation and US market meltdown in January 2016.

The most extreme example was in 2008 when Bernanke and other regulators guaranteed every money market fund in America, guaranteed every bank deposit in America regardless of FDIC insurance limits, pushed interest rates to zero, printed money, acquired bad assets, and engineered over $10trillion of hidden currency swaps with the EUROPEAN CENTRAL BANK and other banks. The idea of free markets finding a level at which markets clear and bad banks fail was passe in the global monetary workings in the second decade of the 21st century. "Too-big-to-fail" entered the modern lexicon as did the popular perception of leviathans pulling the strings of the modern world's biggest economy took hold. The dangers posed by this portrait of utterly dominant and incestuously intertwined banks in CORVID-19 seems exaggerated. These monoliths are upstaged by a new wave of innovation in capital markets that has changed securitization and debt issuance and led to more direct lending by other financial firms. The banks' corporate lending as a share of GDP has stagnated at about 12%, even as the banks rebuilt their balance sheets after 2008 bailout and corporate America has indulged in a borrowing boom. Even when banks were flush with capital in 2020 and liquidity, it was the capital markets that have financed the bulk of the increase in corporate debt.

Banks' stagnation and their risk aversion has had consequences for how central banks respond to crises. In 2007-2009 the FED intervened in capital markets, but went to much greater lengths to pump up commercial and investment banks. In 2020, however, banks went relatively unscathed as capital markets seized up. Rather than acting as a lender of last resort to banks, the FED became market maker of last resort, intervening in credit markets with a total size of about $23.5trillion. Central banks use their balance sheets to affect asset prices and financial conditions, beyond simply moving short-term interest rates. Large-scale asset purchases (LSAP), or equivalently quantitative easing (QE), is an example of unconventional monetary policy, commonplace since the Great Financial Crisis. These balance sheet policies differ from interest rate policies because the level of the short-term policy interest rate can be set independently of the volume of bank reserves in the system. The main transmission channel operates by altering the composition of private sector balance sheets. The types of assets central bank buys and sells become important in the credit it directs. The sheer breath of the intervention takes the FED into new territory. As the Bank for Internatıonal Settlements (BIS) noted in its annual report, the consequences of bailing out capital markets on such a scale could linger.

The broad and forceful provision of liquidity has stemmed market dysfunction, but it has also shored up asset prices across a wide risk spectrum. This could affect the future market pricing. The scale of FED's intervention in 2020 surpasses any other in its history.

A notable shift has taken place in the rest of the world, where capital markets have historically played a smaller role. In 2007 global non-bank financial assets stood at $100trillion, equivalent to 172% of GDP and 46% of total financial assets, according to the FINANCIAL STABILITY BOARD (FSB). In 2020 these assets at $183trillion, constitute 212% of GDP, or 49% of the world's financial assets. An important structural change in the financial markets is that many industrial corporations have become providers of wholesale funds to banks rather than net borrowers. "In 2020, most credits take the form of collateralized loans, that derive from wholesale money markets, not banks; ultimately sourced from corporate and institutional cash pools (CICPs), and which are used mainly for funding, i.e., refinancing of existing positions, rather than borrowing for new investments. In a world dominated by funding the rollover of huge outstanding debts, rather than the financing of large-scale new capital projects, balance sheet capacity, i.e., liquidity, is more important than the level of interest rates, i.e., the cost of capital. Liquidity has both private sector and Central Bank dimensions, with the private sector dependent on being able to bundle up good quality, longer horizon securities as collateral and Central Bank acting as a liquidity backstop in emergencies. The need to continually refinance our towering debts means that crises can occur when funding stops or slows, which, in turn, may arise because of lack of sufficient good-quality collateral and/or the withdrawal of Central Bank liquidity support. When both combine, such as in 2007-2008, a significant crisis can unfold. The conclusion is that quantitative tightening (QT) and public sector austerity policies that diminish the supply of government bonds create a dangerous mix that threatens severe and persistent financial market volatility." (The Author(s), 2020).

The gradual rise of America's capital markets can be traced to the 1940s and the 1950s, when the amounts of money raised by mutual funds began to swell. The 1980s brought about a rush of debt issuance, especially of junk bonds, by companies. Then, there was a boom in household debt winding up in capital markets via new financial technology of securitization, or bundling loans into bonds and reselling them that eventually imploded and helped to deliver 2007-2008 crisis. The crisis showed that banks remained at the center of the financial system, acting as dealers and speculators. Subsequent rule changes have nudged them from the limelight. DODD-FRANK ACT in America in 2010 and international regulation, BASEL FRAMEWORK, have required banks to fund themselves with more capital and encouraged them to take less risk. As a results, banks in America had nearly $2trillion worth of core capital on their balance sheets in 2020, almost double the amount they did in 2007. Many of these rules were aimed at taming the investment-banking activities that sit inside huge firms such as BANK OF AMERICA and JP MORGAN CHASE. Regulation has blunted banks competitive advantage. Their vertically integrated organizational structure that enabled them to issue loans, monitor and collect those loans, and hold the associated risk on their balance sheets gave them an edge over investors and funds seeking to profit from just one slice of a transaction. It made up for the fact that they were slow to embrace technology. As banks have grown risk-averse, non-banks, often tech-savvy, have stepped up. When the banks are regulated, and the rest of the financial system are only lightly regulated, regulatory arbitrage is a natural outcome.

"China's policymakers can also fall back on the unusual resources of a Leninist party state. Chief among these is the ability to shift policy decisively, comprehensively, and without regard to procedural or legal niceties. That was on display in response to the great financial crisis. The 4-trillion-yuan stimulus – already effective in timing and size – was the tip of a spear that comprised monetary, fiscal, industrial, and financial regulation policies. It was in evidence again during the 2015 stock market meltdown, which ultimately came to an end when trading in more than a thousand stocks was suspended by administrative fiat, locking unfortunate investors into loosing positions. The stock market collapse also showcased the state's ability to contain flows of information. Press, television, and media all received instructions on how to report the market fall, with policymakers aiming to stem the panic by eliminating the bad news." is how Thomas Orlik explains financial markets are managed in the Peoples' Republic of China in CHINA: THE BUBLE THAT NEVER POPS (Oxford University Press, 2020).

"In China, as in the rest of the world, "innovation" seemed to function as a catchall term for whatever the capitalist zeitgeist viewed at the time as cutting-edge and good. In a measure of how important private business was viewed as being, Liu He, an economic advisor in Beijing, coined the term "56789" to describe it. That referred to the fact that private business already generated 50% of all tax revenue and accounted for 60% of GDP. 70% of all innovation produced, and, crucially, 80% of all jobs in the cities. (The 90% was the proportion of the total registered companies.) The reality, however, was that small and medium-size private companies, despite their importance, were still suffering under a deeply unfair system. Most bank credit, not to mention government contracts, had long gone to state-owned companies rather than private ones. ……. Nicholas Lardy, an economist who had long argued that the private sector was stronger and faced less discrimination than other economists had claimed, reversed his stance in early 2019 in his provocatively titled book the state strıkes back: the end of economıc reform ın Chına? His previous book, published four years earlier, had by contrast been called markets over mao: the rıse of prıvate busıness ın Chına." informs dexter roberts in the myth of chınese capıtalısm: the worker, the factory, and the future of the world (Dexter Roberts, 2020)[1].

Between February 19th and March 23rd, 2020, the S&P500 index lost a third of its value. With barely a pause by May it has recovered more than half of its loss. The catalyst was FED's buying up corporate bonds, including high-yield 'junk' bonds. The market for new issues of corporate bonds, which froze in February, has reopened. Corporations have issued $560billion of bonds in the last 6 weeks to May, double the normal level forestalling a cascade of bankruptcies. The idea of free markets finding a level at which markets clear and poorly managed corporations fail was still passe in the biggest market economy on the planet in the third decade of the 21st century. Investors have cheered it on by piling into stocks. They have nowhere else good to put their cash. Government-bond yields are barely positive in America, negative in Japan and much of Europe.

"Over the past several decades, demand for goods and services has become the world's scarcest and most valuable resource, with Unites States playing the role of swing producer. Companies everywhere fight for larger share of a global market even as they collaborate to suppress the size of their domestic markets. This is the very definition of "beggar thy neighbor". Because "competitiveness" has become a euphemism for pushing wages down, either directly or through currency depreciation and weaker social safety nets, the fetish of competitiveness has generated a global spending shortage. Trade wars are an almost inevitable consequence of globalization as it has been practiced. Peoples who fundamentally share common interests are being set against each other because the ultra-rich have been successfully waging a class war against everyone else. .... The world's rich were able to benefit at the expense of the world's workers and retirees because the interests of American financiers were complementary to the interests of Chinese and German industrialists. Both complemented the interest of the wealthiest throughout the world, even from the poorest countries. The modern surplus countries do not need colonies to absorb their excess production because they can work with bankers, their willing collaborators in the deficit countries. The perverse result is that deepening globalization and rising inequality have reinforced each other. Business across the world use international competition as an excuse to push for lower wages, weaker environmental and safety regulations, preferential tax regimes, and regressive transfers. Squeezing ordinary households has, apparently, been much easier than increasing productivity, investing in infrastructure, and improving health and education. It is not just coincidence that throughout modern history, high levels of income inequality have coincided with soaring levels of debt." claim Matthew C. Klein and Michael Pettis. (Klein and Pettis, 2020). Economic globalization has been one of the contributing factors: while open trade raises aggregate income, it also increases income inequality.

"The crisis began in the private financial sector in the United States, but the Eurozone alone must bear the blame for transforming it into a persistent crisis of public debt. The consequences have been dramatic, particularly in terms of rising unemployment, identitarian retreat, and growing anti-immigrant sentiments. Prior to crisis, however, European integration seemed to be succeeding: unemployment was down, the extreme right was in retreat, and migrant flows were higher than the United States.", wrote Thomas Piketty in capıtal and ıdeology. (Harvard College, 2020). Once the most dangerous part of the crisis had been averted, a set of new and rather bleak post-2008 crisis problems came to dominate global economic debate. Arguably, the most pressing was how to fix the financial system that had so calamitously failed followed by the growing awareness of the inequality of income and wealth that had risen sharply during a decade of stubborn stagnation in productivity growth following the 2008-crisis. A fundamentally different intangible economy emerged in USA, UK, Sweden, and Finland. The share of investments in intangible assets were greater than tangible assets in total investments in 21st century in these economies. GREENSPAN PUT

induced dot.com economies. GREENSPAN PUT induced dot.com bubble in the last half decade of the 20th century marks the beginning of the steady increases in investments in intangible assets, and thus the beginning of intangible economy in the United States.

Jonathan Haskel and Stian Westlake explain in CAPTIALISM WITHOUT CAPITAL: THE RISE OF THE INTANGIBLE ECONOMY (Princeton University Press, 2018). Economists and accountants present capital as a physical input, as one of the two factors of production, when in fact, capital has never been about a thing, but always about a legal coding. Never just about output and input, but always about ability to capture and monetize expected returns. Marxists, for example, claim that capital is a relational concept, emphasizing the exploitative relation between capital and labor underestimating the role of law in the process of wealth creation. By grafting the modules of the legal code of capital onto an asset, its holder obtains a right over and above others, such claims enjoy greater durability and face fewer obstacles to lock in past gains by converting them into state money. Also, these special rights are universal and can therefore be enforced against the world. Haskel and Westlake have recognized that restricting the world to things one can see and touch can be highly misleading, but have not recognized the central role of law in coding capital.

Measuring and valuing intangibles has become important since the more conventional capital in form of land, factories, machines and other tangibles has been in decline. Tangible capital investments have accounted for only 8% of economic growth in the United States between 1995 and 2003, whereas investments in intangibles have increased from 4% in the late 1970s to more than 10% by 2006. (Haskel and Westlake, 2019). The shares of intangibles in the market value of major corporations has gone hand in hand with a decline in investments. Some called the emerged state of affairs, in which firms sit on stockpiles of cash but with few investment projects on hand "secular stagnation". Some argue that once investments in intangibles are fully accounted for, this emerged state, "secular stagnation" will disappear. Others, however, have suggested that the enclosure of knowledge is responsible for the decline in viable investment opportunities and has led to an "investment famine". Even though patents, intangible assets, are only temporary monopolies, their effects go well beyond their duration by precluding others from using, perfecting, and investing in knowledge and thereby contribute to maintain the skewed distribution of wealth. It is the logic of capital coded in law which rests on the principle that some assets, and by implication, their holders, enjoy legal privileges over others. They obtain stronger rights against the world and even get to make them durable in order to withstand not only unexpected events, the exogenous shocks that create imbalances in neoclassical economic models, but the forces of competition. Competition is essential for the operation of markets. It fuels the forces of Schumpeterian creative destruction that are the drivers of economic progress. But the legal code of capital does not conform to the rules of competition. Instead, legal code of capital operates according to the logic of power and privilege.

The fashionable intangible assets, data, is the new fuel for growth in manufacturing to retail to financial services. But unlike tangible assets, it does not necessarily fuel job growth, but fuels profit growth that tend to be diverted directly into executives and stock holders. A 2018 J.P. Morgan study found that most of the money brought back to US from overseas bank accounts following the 2016 Trump tax cuts went into stock buy-backs. Top 10 US tech companies spent more than $169billion purchasing their own stock in 2018 and the industry as a whole spent some $387billion[1]. APPLE's financial engineering among the largest and most profitable multinational companies needs special mention. In 2018 APPLE had $285billion in cash parked outside of the United States as well as $122billion debt on its consolidated statement. Most of its cash was in offshore bond portfolios over the past decade.

The buybacks have bolstered the top 10% of the US population that owns 84% of all stock. The stock buybacks have become the single largest use of corporate cash for over a decade since 2008 has buoyed markets, as it has also increased the wealth divide, which many believe is an important cause of slower-than-historic growth trend. Global income and wealth inequality, secular stagnation, according to Haskel and Westlake, is better understood by studying the structure and the workings of intangible economy. At the end of 2019, the entire stock market was skewed by APPLE, MICROSOFT, AMAZON, ALPHABET and FACEBOOK. ALPHABET, AMAZON, APPLE and MICROSOFT were worth over $1trillion each in February of 2020. This surge in tech's stock prices raises two worries. One is whether investors have stoked a speculative bubble. The five firms, worth over $5.6trillion in February of 2020 make up almost a 5th of the value of S&P500 index.

The last time the market was so concentrated was 20 years ago, before the crash triggered a widespread downturn. The other concern is that the investors may be right. The big tech firms' supersized valuations suggest their profits will double or so in the next decade, causing far greater economic tremors in rich countries and an alarming concentration of economic and political power. Cassandras note that in early 2000s, on the eve of the dot.com bust the giants of the day – MICROSOFT, CISCO, GE, INTEL and EXXONMOBIL- also made up 18% of the index. Because of their exposure to other tech firms, including frothy startups, MICROSOFT, INTEL and especially CISCO were brought low by the crash rather than being a counterweight to it.

Tech cycles are an integral part of the modern economy. The 1980s saw a semiconductor boom. Then, in the 1990s, came PCs and the INTERNET. Each cycle fades or ends with a bust. 2020's upswing got going in 2007 with the launch of the iPHONE. By 2018, it seemed to be showing its age. Sale of smart phones were stagnating. Data scandals at FACEBOOK crystallized anger about tech giants' flippant approach to privacy. Loss-making antics of flaky tech "unicorns", such as UBER and WeWork, evoked the kind of speculative froth often associated with the tail-end of a long boom. Meanwhile, a seismic struggle is taking place as four principle sectors: the information and communications technology; the power and electric utility sector; the mobility and logistics sector, and the building sector are being decoupled from the fossil fuel industry in favor of adopting the cheaper new green energies. Jeremy Rifkin in the green new deal: why the fossıl fuel cıvılızatıoın wıll collapse by 2028, and the bold economıc plan to save lıfe on earth (Rifkin, 2019)[1] warns: "Increasing concern over climate change, loss of confidence in the long-term financial stability of the fossil fuel industry now facing the prospect of stranded assets, and the growing competitive advantage of emerging solar, wind, and other renewable energies are triggering a revaluation of funding priorities within the global financial sector, with an escalating number of funds transitioning capital away from fossil fuels into green energies and clean technologies of the 21st century." (Rivkin, 2019). The result is that within the fossil fuel industry, "around $100trillion of assets could be carbon stranded," according to CITIGROUP in 2015.

"Anyone who has an informed concern about what global climate – change is on track to do the habitability of our planet – within the lifetime of our children – should have a keen interest in "modern money theory". The reason is simple: As virtually every scholarly study and popular narrative tells us, reversing rising atmospheric carbon levels – and building the adaptive habitats that will enable human society to maintain some version of the current structure – will cost a lot of money. Actually, not just "a lot". The spending that will be required, to employ people to undertake and accomplish everything that will be done, will be on a scale unparalleled in the history of human economics. This fact is made dramatically more challenging by another: most of the ventures and enterprises that will need to be planned, financed, and implemented to confront climate change will not generate financial profits. This means the profit-making finance mechanism of private enterprise – the basic mechanism of what we might call our "standard money theory"– will be unable and/or unwilling to generate the money necessary to undertake the work that climate change is going to require. Under the "standard theory", this leaves only three options for raising the necessary funds: (1) Taxing dollars from the current incomes and profits of citizens and private enterprise. (2) Soliciting philanthropical dollars from the long-stored, after-tax profits private enterprise has already generated. (3) Borrowing dollars from the capital (after-tax savings) of private enterprise. Simple calculations can show that, even in combination, these options are mathematically unable to generate the extra trillions of dollars that will be needed. This starkly "impossible mathematics" of our standard money theory is, in fact, what underlies the dramatic failure of the world, thus far, to take any meaningful actions to combat global warming. To put it bluntly, if the world hopes to successfully confront the challenge of global climate change – and begin doing so within the narrow timeframe that scientific research has given us – we need to "modernize" or standard money theory.", informs J. D. Alt in payıng ourselves to save the planet: a layman's explanatıon of modern money theory (Alt, 2020).

"Alongside, the new industrial competition spurred cost-cutting and are into profit margins and economic growth in the West, forcing many firms to trim or even abandon new capital spending plans, since marginal returns on capital fell too low. Many businesses focused instead on raising the average return on capital by slashing operating costs on their existing capital. By sweating on-site assets harder, they boosted industrial cash flows, which were channeled through wholesale money markets rather than into high-street banks, or into large merger deals, which concentrate global industries, and share-buy-backs that raise financial leverage. Financial markets were forced to focus more on capital distribution and refinancing, rather than serving as traditional capital-raising mechanism.

This changing role makes balance sheet capacity, i.e. the volume of liquidity, far

more important in order to meet the exhausting and persistent demands for debt rollovers, than the cost of capital, i.e. interest rates, to finance the now seemingly less frequent, new capital projects. In the West, as cost-cutting ripped through middle-class work forces, it enfranchised top management's valuable share options. By shaking-up employment patterns, many routine cognitive and semiskilled manual jobs have since been lost. Hours worked have dived and new jobs have largely come in the 'low-hour' industries and in gig economy. Hurt by wage growth, Western households were encouraged to borrow and mortgage more in order to keep up their rates of consumer spending. As industries turned towards 'asset-lite' business models, capital spending fell, notably in oil and retailing, and what has been left is concentrated in the hi-tech sectors. Debt has multiplied in industries like healthcare and technology, largely off-setting the slump in new debt lows going into more traditional industrial businesses, such as energy, autos and chemicals. These changes, reinforced by the prevailing negative demographic forces, have weakened underlying economic growth." heeds Michael J. Howell in CAPITAL WARS: THE RISE OF GLOBAL LIQUIDITY (Author(s), 2020).

The global monetary workings today are a patchwork of floating exchange rates, hard pegs, dirty pegs, currency wars, open and closed capital accounts with world money waiting in the wings. It is unanchored. It is incoherent. It is unknown when a new regime, "the rules of the game" in financial elites' jargon, will be forthcoming; in the midst of chaos in response to the next financial crisis; or after an international monetary conference, the last being at the LOUVRE in Paris on February 22, 1987; or the new regime will emerge as the gold standard did when countries imitated Isaac Newton's 1717 gold peg without an international agreement.

Arguably, next to Nixon's decision to close the GOLD WINDOW at FEDERAL RESERVE BANK OF NEW YORK on 8/15/1971, China's decision to establish the world's first blockchain-based central-bank-issued digital currency, stable-coin and payment system called DCEP will have equal ramifications difficult to estimate, perhaps even more. As the Chairman of the CHINA INTERNATIONAL ECONOMIC EXCHANGE CENTER, Huang Qifan, explained, the organization have spent half a decade in developing DCEP, and in the second half of 2020, it will be introduced by people's Bank of CHına (PBoC) to seven institutions. the ındustrıal and commercıal bank of chına; chına constuctıon bank; the Bank of Chına; the agrıcultural Bank of Chına; alıbaba; tencent; unıon pay.

DCEP will then be available to the general public. The DCEP's partial blockchain-based design will enable PBoC with unprecedented oversight over money flows, giving PBoC a degree of management capability of the Chinese economy that most central banks do not have in managing theirs. DCEP is pegged 1:1 to the Chinese yuan with the objective of being a global digital currency. It is designed not to allow mining or stake on the DCEP network. CHINA TELECOM is developing blockchain-enabled 5G SIM cards to become one of the world's leading platforms for mobile based crypto asset transactions. In 2019 5G services were launched in more than 50 Chinese cities with as many as 110million 5G users.

In 2020, China dominates in global blockchain patents. For better or worse, mobile blockchain payment technology adoption seems unstoppable. HUAWEI has implemented the world's first channel coding scheme, polar codes, pioneered by Dr. Erdal Arikan in collaboration with PBoC on blockchain payment projects.

Before the Chinese RMB joined the SDR, the dollar price of gold and the SDR price of gold were volatile but highly correlated. After October 1, 2016, the date the Chinese joined, the dollar price of gold remained volatile, while the SDR price exhibited far less volatility. The trend line of SPECIAL DRAWING RIGHTS/GOLD is nearly a horizontal line since Chinese RMB joined SDR. SDR900= 1 ounce of pure gold looks like the new monetary benchmark, trading in the narrow range of SDR850 to SDR950, an 11% band with fluctuations of 5.5% above and below the SDR900 central tendency. SDR's basket of major currencies are the dollar, sterling, yen, euro, and RMB. The neat straight-line trend of SDT/GOLD horizontal trend line occurring randomly is infinitesimal. The SDR/GOLD horizontal trend line is an example of auto-regression. This appears only if there is a recursive function, a feedback loop, or manipulation.

Another scenario being scripted is in the past 10 years Russia and China have acquired more gold than any others. They have been most explicit about their unhappiness with the dollar based monetary payment arrangements where all SWIFT transactions are monitored by the United States after the enactment of PATRIOT ACT. Russia and China have each developed proprietary cryptocurrencies on a permissioned, heavily encrypted digital leger, and are well aware that neither the ruble nor the yuan have the needed elements for reserve currency status, including deep liquid bond markets and globally recognized rule of law. By placing their official gold on deposit in a Swiss non-bank vault governed by Swiss law, they can launch the new digital currency on their distributed ledger. Russia and China are not alone in pursuing cryptocurrencies on distributed ledgers. A new class of global cryptocurrencies on a permissioned distributed ledger controlled by the IMF and central banks is also in the works according June 2018 IMF Report, a manifesto for calling government controlled cryptocurrencies.

In the first fifth of the 21st century, in addition to loose monetary policy, there has been a significant growth in corporate cash hoarding in tax havens. As of January 2016, $1.9trillion was held by American companies in cash and cash like assets mostly in tax havens. In the wake of the crisis, offshore wealth grew by 25% between 2008 and 2014, which resulted in an estimated $7.6trillion of household financial wealth being held in tax havens. With tax services provided by the BIG FOUR accounting firms, APPLE, FACEBOOK, AMAZON, and UBER seem to be the leaders of tax evasion schemes that give them use of the cash saved from the tax collector for mergers and acquisitions, that mostly centralizes existing capacity rather than building new as they also provide liquidity for shadow banking refinancing activities of high-street banks.

Gabriel Zucman in THE HIDDEN WEALTH OF NATIONS: THE SCOURGE OF TAX HAVENS (The University of Chicago, 2015)[1] exposes the enabling role of the global financial centers and tax havens. The role of tax havens has also been starkly documented by the release of the PANAMA PAPERS and the PARADISE PAPERS, and in Brooke Harrington's CAPITAL WITHOUT BORDERS: WEALTH MANAGERS AND THE ONE PERCENT (Harrington, 2016)[1]. Without the creation of entire batteries of banking and legal services to serve and help tax evasion and/or tax avoidance on a global scale would not have been possible. The growth of banks that specialize in high-net-worth individuals and of legal offices whose main role is to facilitate transfers of money happened simultaneously with globalization, specifically with liberalized global finance. Branco Milanovic in CAPITALISM ALONE: THE FUTURE OF THE SYSTEM THAT RULES THE WORLD (The President and Fellow of Harvard College, 2019) reports that "10% of global GDP was held in tax havens in 2008".(Milanovic, 2019).

"Consortiums of journalists subsequently broke other scandals, including SWISS LEAKS in 2015 and PANAMA PAPERS in 2016-2017, which disclosed widespread use of tax havens and other practices. These revelations demonstrated the extent of the cheating, even in countries reputed for efficient tax administration, such as Norway. Using data from SWISS LEAKS and PANAMA PAPERS in conjunction with Norwegian tax records (which were made available for study) and data from random tax audits, researchers were able to show that tax evasion was rare among people with little wealth but amounted to nearly 30% of the taxes due on the largest 0.01% of fortunes." informs Thomas Piketty. (The President and the Fellows of Harvard College, 2020).

"All signs are that this has only increased since then. Furthermore, by exploiting data made public by the BANK FOR INTERNATIONAL SETTLEMENTS (BIS) and the SWISS NATIONAL BANK (SNB) on countries where assets are held, one can estimate each country's approximate share of offshore assets held in tax havens relative to the total (lawful and unlawful) assets held by residents of each country. The results are as follows: "only" 4% for the United State, 10% for Europe, 22% for Latin America, 30% for Africa, 50% for Russia, and 57% for the petroleum monarchies. Once again, these should be regarded as minimum estimates. These calculations exclude (or only partially account for) real estate and shares in unlisted companies." adds Thomas Piketty. (President and Fellows of Harvard College, 2020 p, 601) and heeds, "The Middle Eastern inequality regime epitomizes the explosive mixture of archaism, hyper-financial modernity, and collective irrationality typical of recent times. It bears traces of the logic of colonialism and militarism; it contains reserves of petroleum that would be better kept in the ground to prevent global warming; and its wealth is protected by the extremely sophisticated services of international lawyers and financers, who find ways to put it beyond the reach of covetous have-nots. Finally, note that the oil monarchies of the Persian Gulf are together with post-communist Russia, the countries that make most extensive use of the world's tax havens." (The President and the Fellows of Harvard College, 2020).

Nicholas Shaxson in treasure ıslands: uncoverıng the damage of offshore bankıng and tax havens (Shaxson, 2011)[1] writes "Some 85% of international banking and bond issuance takes place in the so-called Euromarkets, a stateless offshore zone. Nearly every multinational corporation uses tax havens, and their largest users-by far- are on Wall Street." (Shaxson, 2011) "…the British Virgin Islands, with fewer than 25,000 residents host over 800,000 companies, or more than 40% of foreign direct investment into India comes from Mauritius.

Ricardo's theory (comparative advantage) loses its traction. Companies and capital migrate not to where they are most productive but to where they can get the best tax break. There is nothing "efficient" about any of this. The world contains about 60 secrecy jurisdictions, or tax havens, which can be divided roughly into 4 groups: a set of continental European haves, a British zone of influence centered on the City of London and loosely shaped around parts of Britain's former empire, a zone of influence focused on the United States, and a fourth category holding unclassified oddities like Somalia and Uruguay." (Shaxson, 2011).

Tom Burgis in KLEPTOPIA: HOW DIRTY MONEY IS CONQUERING THE WORLD offers another estimate: "What mattered was that the money moved to a special place, a place beyond the reach of governments, of law, of society. This place was known as 'offshore'. As the richest 1 per cent came to amass a quarter of all increases in incomes – leaving the bottom 50 per cent with less than a tenth – the amount of money stashed 'offshore' grew to $7.7trillion. That was, at least, the best guess, because a guess was all anyone was allowed to make. Put another way, of every hundred dollars the world's households held, eight were offshore. When economic crises came, a country's resilience was measured by its reserves, the store of cash, assets and gold upon which it could draw. The offshore bounty was double the single biggest reserves – China – and more than half of the global total. Swiss banks held a third of this bounty. " (Burgis, 2020).

In the trıumph of ınjustıce: how the rıch dodge taxes and how to make them pay[1] Emmanuel Saez and Gabriel Zucman claim that: "since 1980 the tax system has enriched the winners in the market economy and impoverished these wo realized few rewards from economic growth." (Saez and Zucman, 2019) and add, "the break of a tax-avoidance industry that obscures income and wealth; the emergence, with globalization, of new loopholes exploited by multinational companies; the spiral of international tax competition that has led countries to slash their tax rates one after another." "were not sudden changes in taxation due to popular appetite for exempting the wealthy, but to forces that have prevailed without input from voters." (Saez and Zucman, 2019) "Today, close to 60% of the large and rising amount of profits made by US multinationals abroad are booked in low tax countries. … US firms have in 2016 booked more than 20% of their non-US profits in 'stateless entities', shell companies that are incorporated nowhere, and nowhere taxed." (Saez and Zucman, 2019). 91 of 500 FORTUNE listed US corporations did not pay any corporate income tax in 2018 according to BLOOMBERG.

"In 2018, … the Irish subsidiaries of American corporations generated about $53billion in profits – roughly the same amount of profits generated by US subsidiaries in Canada ($31billion), China ($13billion), and Japan ($13billion) combined. Dutch subsidiaries of US companies generated $87billion in profits in 2018 – about equal to the profits earned in Australia ($10billion), Brazil ($4billion), the United Kingdom ($47billion), France ($2billion), Germany ($7billion). Hong Kong ($8billion), and Mexico ($9billion) together. This cannot be explained by real economic relationships: the explanation is instead profit shifting meant to minimize tax obligations. The seven corporate tax heavens together were responsible for more than $324billion in US direct investment income." write Matthew C. Klein and Michael Pettis. (Klein and Pettis, 2020).

Moreover, in the great reversal: how Amerıca gave up on free markets (Presidents and Fellows of Harvard College, 2019)[1], Thomas Philippon shows that "since 2000, US industries have become more concentrated and American firm's profit margins have increased. At the same time, investment has been weak, despite high profit margins and low funding costs." (Philippon, 2019). "The rise in profits, the rise in concentration, and the decline in labor share are phenomena specific to the US." (Philippon 2019).

Much that has happened to US economy since the 1990s has not been to the typical worker's advantage. Growth in output, wages and productivity slowed. Inequality has risen, as have the market share and profitability of the most dominant firms. Many argue that the dominance of big firms bears some blame. The rise in concentration and domestic competition weakened by lax antitrust enforcement, anticompetitive practices and regulatory changes friendly to powerful firms have weakened domestic competition is Thomas Philippon's view. Thomas Philippon finds a positive and statistically significant relationship between concentration and productivity in the 1990s but not more recently. What seems clear is that even as concentration has risen across the economy over the past two decades, the rate of productivity growth has not. If superstar firms are indeed a force for concentration, their unique capabilities have not translated into broader gains for the US economy. As, Thomas Philippon notes, economic power is not all that matters. America's tech giants have gobbled up competitors and spent lavishly on political donations and lobbying. There is no guarantee that superstars, having achieved dominance, will defend it through innovation and investment rather than anti-competitive behavior. Even if they are perfectly efficient, Americans might worry about their influence over communities, social and political norms.

Philippon summarizes these 21st century developments as: "Most US domestic markets have become less competitive, and US firms charge excessive prices to US consumers. Excess profits are used to pay out dividends and to buy back shares, not to hire and invest. At the same time, barriers to entry have increased, and antitrust enforcements have weakened. These trends in the US were not exported to Europe, and, in a stunning reversal of history, many European markets (airlines, cell phones, and internet providers, among others) are now more competitive and cheaper than their American counterparts." (Philippon, 20019) And adds, "contrary to common wisdom, the main explanation is political, not technological: I have traced the decrease in competition to increasing barriers to entry and weak antitrust enforcement, sustained by heavy lobbying and campaign contributions." (Philippon, 2019). "The empirical research on the links between competition, market power, and productivity trends to support the view that greater competition increases an economy's productivity. The OECD has looked at the evidence across its member countries, while in the US the 2017 economıc report to the presıdent from the councıl of economıc advısors suggested that increased concentration in many sectors of the economy, and a slowdown in the rate of creation of new businesses because of barriers to entry in some markets, help explain why productivity growth in the US has been so slow for the past decade." confirms Diane Coyle in markets, state, and people: economıcs for publıc polıcy (Princeton University Press, 2020).

Jonathan Tepper with Denise Hearn, in the myth of capıtalsm: monopolıes and the death of competıtıon, document market concentration that has increased since early 1980s. "Two corporations control 90% of the beer Americans drink; four airlines completely dominate airline traffic; five banks control about half of nations banking; many states have health insurance markets where the top two insurers have an 80% market share; high-speed internet access are local monopolies; four players control US beef market; three companies control 70% of the world's pesticide market and 80% of the US corn-seed market; GOOGLE completely dominates internet searches with 90% market share; FACEBOOK has an almost 80 share of social networks."(Tepper and Hearn, 2019). And they add, "It is not low growth that is increasing inequality but the rise of market concentration and the death of competition. The evidence from recent economic studies is overwhelming: the economic and political power of monopolies and oligopolies has completely tilted the playing field in favor of dominant corporations against employees. Many industries are dominated by very small number of firms. There are fewer new startups to compete with existing big companies. There are fewer companies competing to hire workers, and wages stagnate as the balance of power has shifted to large corporations. None of these outcomes is inevitable. Capitalism can be fixed." Tepper and Hearn, 2019).

"If the entities that make up a power-law distribution fluctuate in size, then the exponent of the power law becomes a proxy for system-level volatility. It follows that the firm size distribution should influence market volatility." writes Scott E. Page in the model thınker: what you need to know to make data work for you, and adds "An examination of volatility patterns in the United States shows that volatility rose in the 1970s and 1980s and fell for the next two decades in what some call the "Great Moderation". Beginning around 2000, volatility again increased. It is possible to explain these volatility patterns by changes in the distribution of firm sizes. As the distribution of firm sizes become longer – (shorter) – tailed, the larger firms have a disproportionally larger (smaller) effect on volatility. In other words, aggregate volatility increases (decreases) as the firm size distribution becomes longer – (shorter) – tailed. In 1995, when volatility was low, WALMART had revenues of $90billion, which corresponded to 1.2% of GDP. By 2016, WALMART's revenues had increased to $480billion, or 2.6% of GDP. WALMART's share of GDP more than doubled. In 2016, an increase or decrease in WALMART's revenue would contribute twice as much to aggregate volatility."(Page, 2018). Tax evasion, austerity, and extraordinary monetary policies were all mutually reinforcing. The outcomes of bailouts a decade later seem as losses of wrong financial bets got nationalized, and profits of right bets got privatized caused the public debt of rich economies to implode after 2008 with the bailout. Risks got socialized and rewards privatized as the global economy had begun a long-term transition from a mass-production economy based on cheap oil to an information economy based on cheap microchips. The ideological and institutional context that evolved with the bailing out of the crashed global finance heightened fiscal competition to attract

private investors and appease the wealthiest taxpayers made more difficult by unprecedented proliferation of tax heavens. It became increasingly challenging in the 1990s up to the financial crisis to establish norms of fiscal justice or to collect enough taxes to finance and ambitious welfare state. After the bail out, the new heights of public debt, not seen since WWII, made it practically impossible to finance an ambitious welfare state for the rich economies. Or so was/is the narrative of monetarist that Modern Monetary Theory (MMT) challenges.

"The Great Recession, which lasted from December 2007 to June 2009, left permanent scars on communities and families across the United States and beyond. It took more than six years for the US labor market to recover all 8.7 million jobs that were lost between December 2007 and early 2010. Millions struggled for a year or longer before finding employment. Many never did. And some who were fortunate enough to find work often had to settle for part-time employment or take jobs that paid substantially less than they had been earning. Meanwhile, the foreclosure crisis swallowed $8trillion in housing wealth, and estimated 6.3million people – including 2.1million children – were pushed into poverty between 2007 and 2009. Congress could and should have done more, but the deficit myth had taken hold. By January 2010, with unemployment rate at a staggering 9.8%, President Obama was already moving in the opposite direction. That month, in his State of the Union address, he committed to a reversal of fiscal stimulus, telling the nation, 'Families across the country are tightening their belts and making tough decisions. The federal government should do the same.' What followed was a sustained period of self-inflicted harm. The Federal Reserve Bank of San Francisco (FRBSF) estimates that the financial crisis and the lackluster recovery robbed the US economy of up to 7% of its output potential from 2008 to 2018. Think of this as a measure of all the goods and services (and income) we could have produced over that decade but didn't because we failed to do enough to support our economy by protecting jobs and keeping people in their homes.", writes Stephanie Kelton in THE DEFICIT MYTH: MODERN MONETARY THEORY AND THE BIRTH OF THE PEOPLE'S ECONOMY (Kelton, 2020).

Spurred by the vast economic changes that followed the fall of the Berlin Wall, the entire World economy in 21st century enjoyed excess production and abundant savings, with China alone having to deploy an annual $6trillion nest-egg. Not surprisingly, more and more economies are seeking to increase their trade surpluses, so becoming potentially even bigger net exporters of capital. However, this plainly requires some other economy, or economies, to run large counterpart trade deficits. Since trade deficits effectively mean deficits for domestic manufacturing industry, which is a key source of future productivity growth and remains a major urban employer, this policy creates emotive political challenges. The need to run large, persistent trade deficits may also explain why it is probably still too early for China to take America's place in the World trading system. Without US as the facilitator, other economies are to run deficits to accommodate China and reduce their underlying rates of economic growth.

"The neoclassical economics and finance paradigms ignore money and liquidity. Markets are assumed to exist everywhere and at all times, and frictionless trade is supposed to occur. Yet paradoxically, illiquidity is the ultimate friction and without sufficient liquidity there would be a widespread market failure and no trade. Illiquidity can occur both when the supply of money and credit breaks down, and when heightened uncertainty (again assumed away in the standard framework) causes investors to hoard 'safe' assets, such as cash, for precautionary reasons. In practice, 'no trade' rather than 'trade' is more likely to be the normal state. Hence, fluctuations in the quantity of liquidity matter greatly. Put another way, in the real world imperfect markets and market failures are commonplace, and the efficient market hypothesis (EMH), the bedrock of finance theory, simply does not apply. Financial crises happen. ……. The dominant players behind global liquidity are US FERERAL RESERVE, China's PBoC, and cross border funding markets. E.g. Eurodollars. ……. China essentially re-exports large quantities of US dollars, rather than exporting RMB. At the same time, US liquidity increasingly depends on wholesale money markets, which receive these Chinese and similar US dollar inflows from corporate and institutional cash pools (CICPs)." observes Michael Howell. (Author(s), 2020).

Microchips are ubiquitous, embedded into most manufactured products from toasters and to ballistic missiles. WORLD SEMICONDUCTOR TRADE STATISTICS, a data provider, recons that the market for chips was worth $421billion in 2017, a rise of 1.6% on previous year[1]. If anything, these raw numbers understate the importance of chip-making.

The global e-commerce is reckoned to have revenues over $2trillion a year, for example. If data are the new oil, microchips are the internal-combustion engines that turn them into something useful. The ubiquity of chips has led to the growth of a vast global industry when globalization was the center core of WASHINGTON CONSENSUS. Microchips have billions of components and are made in ultra-modern factories that required tens of billions of dollars of investment to build. Indeed, that such devices can be built at all is a living testament to global specialization and trade that was put in place with American leadership in the last two decades of the 20th century. Globalization was an actively pursued American policy, not an inertial force of nature. It was undertaken to increase the power and growth of transnational corporations by moving them out from under the authority of nation states and into a 'global community a la Davos'. These hugely complicated products have spawned an equally complex global know-how interdependence and supply chain involving thousands of specialized companies all around the world.

"Whenever a new product relies on improving microprocessors, the growth of its performance, or decline of its cost, will proceed at rates closely resembling Moore's law. This is obviously true about the processing speed of computers (instructions per second), while the cost of computing has been declining even faster (about 50%/year since the late 1970s), the cost of camera chips (pixels/$) has been dropping nearly as fast, and the capacities of magnetic storage (in recording density of storage media) have been growing by more than 50%/year since 1990s. Other advances associated with silicon and semiconductors have seen rapid doublings of performances or declines in cost: the efficiency of light-emitting diodes (lumens per watt) has been rising by about 30%/year since the late 1970s, the (doubling every 3.3 years) and the cost of photovoltaic cells (dollars per peak watt) has recently been declining at an annual rate of 20%. …. Rapid progress is now assumed to improve everything from the energy density of batteries to 3D printing of living organs in short periods of time. These advances have also raised unrealistic expectations about the general progress of dematerialization. Thanks to Moore's law, that trend has been quite impressive as far as computation is concerned, with the mass per unit of RAM ratio having been out by nine orders of magnitude since.", informs Vaclav Smil in growth: from mıcroorganısms to megacıtıes (Massachusetts Institute of Technology, 2019).

But in the age of make Amerıca great agaın, and made ın Chına target dates, both China and the United States see the semiconductor technology as crucial to their future. For America, its lead in chip-making is a strategic asset. PENTAGON's guiding hand was instrumental in the development of the earlier uses of chips produced by Silicon Valley for the guidance systems of nuclear missiles. In 2014, China established the natıonal ıntegrated cırcuit ındustry ınvestment fund to domestically supply its needs. In 2014, China's domestic supply capability was less than a third. The natıonal ıntegrated ındustry ınvestment fund was set up to finance research and development for integrated circuit industry, and is planned to grow from $65billion in 2014 to $305billion by 2030 to supply its needs domestically and reduce China's dependence on foreign suppliers. It seems, President Trump has not welcomed China's plans.

A manifestation of the uneasiness of uncomfortable interdependence of CHIMERICA as summarized by Stephen Roach in unbalanced: The codependence of Amerıca and Chına (Roach, 2014)[1] is their technological competition in chip-making at a historical moment in 2019. For 50 years, progress in chip-making has been summarized by MOORE'S LAW, which state that the number of components that can be crammed onto a chip doubles every two years and thus, roughly, so does its computing power. But the law is breaking down, losing its predictive capability, and leaving the future of the industry looking fuzzy and less certain than at any time in the past. With the advent of asset manager capıtalısm, US monetary policy was set since 1987 under Maestro Greenspan's baton with low interest rates and ample credit fine-tuned to generate higher asset prices (GREENSPAN PUT) and create wealth effect to spark broader economic growth by making rich richer as chronicled by Bob Woodward's hagiography maestro: greeenspan's FED and the amerıcan boom (Woodward, 2000). The maestro fell short of achieving broader economic growth but was spot-on in creating the stock market bubble for dot.com startups followed it by enabling a residential real estate bubble after NASDAQ's crash and passed the baton to Ben Bernanke in 2006 for the finale. Hand-picked by Chaney-Bush Whıtehouse, the new maestro was one of the prominent disciples of Milton Friedman's interpretation of 1929 FINANCIAL CRISIS, perhaps, the most apprenticed in Friedman's historical causes of 1929 great depressıon in his generation for the finale: the 2007-2008 global fınancıal crısıs. The new maestro was not going to repeat FED's mishandling of 1929 as

he promised to Milton Friedman on Friedman's birthday celebration.

Yet, the real US GDP between 1975 and 2017 roughly tripled, from $5.9trillion to $17.19trillion. During this period, productivity grew by about 60%. But from 1979 onwards, real hourly wages for the great majority of American employees have stagnated or even fallen. ıan goldin and chris kutarna in age of dıscovery: navıgatıng the rısks and rewards of our new renaıssance (Goldin and Kutarna, 2016) write: "The S&P 500 companies as a group gave almost all their 2014 profits back to shareholders (via dividends and share buybacks), rather than bet on new projects and ideas." In other words, for almost 4 decades a tiny elite has captured nearly all the gains from this expansion. Perhaps the greatest transfer of wealth in history, but certainly in the capitalist history not only in the United States but at differing rates in the world, took place and 6+ billion people watched 'eyes wide shut'. According to 2017 OXFAM REPORT: AN ECONOMY FOR THE 99%[1], 62 men in 2016 owned the same amount of wealth as the poorest half of the world's population. In THE 2017 world economıc forum report ranking the quality of nations' infrastructures, the United States ranked 9th, behind countries like the Netherlands, Japan, France, Switzerland, and South Korea. Unfortunately, in relation to a key measure of the digital infrastructure, the United States ranked even worse, 19th, among the nations of the world in fixed-broadband internet subscriptions, with slower internet speeds. Meanwhile, the wealth of the 62 very richest individuals increased by 45% between 2010 and 2015, a jump more than half a trillion dollars in total. Over the same period, the wealth of the bottom half fell by just over a trillion dollars, a drop of 38%. In 2018, the world's top 26 billionaires owned as much as the poorest 3.8billion according to OXFAM[1], as the billionaires increased their fortunes by $2.5 billion per day, while the poorest half of humanity saw their wealth dwindle by 11%, billionaires' riches increased by 12%. In 2018 the top 26 wealthiest people owned $1.4trillion, or as much as the 3.8billion poorest people. In 2017, it was the top 43 people. The mega wealthy have also become more concentrated, as the marginal benefits of economic growth have gone overwhelmingly to the rich while marginal costs have gone mainly to the poor.

Francois Bourguignon in the golbalızatıon of ınequalıty concludes, "Of course, we have seen inequality increase in a majority of countries, notably in developed ones and drastically so in some cases. … Moreover, …while the globalization of trade and the mobility of labor and capital have a certain responsibility for the rise in inequalities within countries, they do not account for it completely. Through various domestic policies, the effectiveness of which unfortunately tends to shrink over time, countries may still influence the evolution of inequality within their borders and they should in theory be able to prevent it increasing to such a point that it becomes costly to the economy and to society." (Princeton University Press, 2015).

Few weeks before the 2018 Davos World Economıc Forum of select plutocrats who advocate markets' efficiency over governments' and globalism's superiority over nationalism, and some mega asset managers, Bloomberg announced that China produced 2 US $billionaires a week, about 100, in 2017, and updated the 2017 announcement to a US $billionaire every other day for 2018, about 180, few weeks before the 2019 DAVOS meeting. For more than 100 years, neoclassical economics ignored Pareto's explanation of the dynamics of wealth distribution, but embraced pareto efficıency and optımalıty. Thomas piketty in capıtal and ıdeology, though in general agreement with the findings of oxfam reports, offers a nuanced cause. "Inequality is determined primarily by ideological and political factors, not by economic or technical constraints. … They are constructed around specific political and ideological projects and relied on specific power relations and legal and institutional systems. The same is true of ownership societies, trifunctional societies, social-democratic and communist societies, and indeed of human societies in general." (President and Fellows of Harvard College, 2020). He adds, "The fact that net public capital fell to zero or below zero in nearly all the rich countries in the 1980s reflects profound political ideological transformation of the regime that existed in the period 1950-1970, when governments owned 20-30 percent of national capital. Capitalists found this situation untenable and decided to reassert control. Previously, in the 1950s, after two world wars and a Great Depression, governments faced with the challenge of communism and chosen to rapidly shed public debt stemming from the past to give themselves room to invest in public infrastructure, education, and health: they also nationalized previously private firms. By the 1980s, however, the ideological perspective had shifted. More and more people came to believe that public assets would be better managed outside the public sphere and should therefore be privatized. The decline of public capital was the result. In other words, the rich countries remained rich, but their governments chose to become poor. In practice, rising public debt in 1980s was in part the consequence of a deliberate strategy intended to reduce the size of the state. Reagan's budget strategy in the 1980s may be taken as a typical example: it was decided to sharply reduce taxes on top earners, which added to the deficit, and this increased the pressure to cut social spending. In many cases, tax cuts for the rich were financed by the privatization of public assets, which in the end amounted to a free transfer of ownership: the wealthy paid $10billion less in taxes and then used that $10billion to buy government bonds. The United States and Europe have continued to pursue this same strategy to this day, increasing inequality and encouraging concentration of private wealth." (The President and Fellows of Harvard College, 2020).

The mainstream economic theory was neither able to offer convincing explanations of what, how, and why, nor was it able to predict these booms and busts, but the risk models of quantitative finance provided a mathematical cover-up helping many to watch the greatest transfer of wealth 'eyes wide open shut' as the digitally connected global financial network with capability to move money at the speed of light with its elite intact and firmer in charge was reorganized.

The last decade of the 20th century witnessed the apparently boundless co-dependent rise of two forces particularly after telecommunications deregulation in 1996: the information revolution and financial markets. The 21st century was inaugurated with FED's Alan Greenspan's fear mongering of possibility of global computers' crashing, and with claims about the advent of a "new economy" characterized by the flourishing of IT and financial markets capable of relentless growth. Global computers did not crash but the possibility gave Greenspan to cut interest rates and flood the markets with easy credit to unsuccessfully prolong the dot.com bubble. But, Greenspan's interest rate cut and flooding the market with easy credit in 1997 to fight Asian flu was not a failure in keeping up the bubble. However, it was the coordinated efforts of World Health Organization that contained the epidemic, not Greenspan's rate cut. By October 1999, the market cap of 199 Internet stocks tracked by Morgan Stanley was $450billion, about the same size as the GDP of the Netherlands. The total sales of these companies were about $21billion, and their collective losses were $6.2billion. The dot.com bubble burst in March 2000. 8 years later, the 2008 financıal crısıs spoiled the hyped bright expectations for 6+billion residents of planet Earth.

John H. Miller in a crude look at the whole: the scıence of complex systems ın busıness, lıfe, and socıety wrote, "At the heat of the2008 financial collapse was an economic crisis that fully embraced all of the seven deadly sins. Gluttonous fixed-income-asset buyers, for the promise of slightly higher returns, were willing to buy up newly formed collateralized debt obligations. Extravagant home buyers, hoping that rising house prices would allow refinancing in the future, opted for houses and ballooning mortgage payments well beyond their current means. Greedy mortgage brokers, able to pass on even suspect mortgages to firms that created and quickly sold off mortgage backed securities, were willing to qualify almost any buyer. Envious firms, wanting to boost their bottom lines, began leveraging themselves while marketing suspect derivatives to their customers. Slothful rating agencies, relying on the word of the firms and outdated statistical models, gave absurdly high ratings to novel securities while collecting commissions. Prideful government agencies, relishing the increase in home ownership and the power of the unregulated market, stood idly by. The point is not to tell some modern morality tale but rather to emphasize how, at each level of the system, the entities involved were following perfectly understandable – though perhaps not virtuous – incentives. … Unfortunately, thinking that understanding the parts of a system implies that you understand the whole system is a sin that is committed all too often. (Miller, 2015). The 2008 economic crisis, a demon of our own design, was also a crisis for orthodox neoclassical economic theory, the theory of its design. If the origins of the crisis are thoroughly human, so must be its solutions. A decade of trauma has had a chastening effect among some peddlers of neoclassical economic theories. They started thinking old ideas, asking new questions, and occasionally welcoming heretics back into the fold. Some believed that what failed was not just a financial system, and a way of regulating that financial system, but a set of economic theories, and that we need to reject simplicities of neoclassical economics, reject overly mathematical economics, and revisit the insights of the past and try to do good science by learning how good science is done from disciplines that succeeded. Before 1980 many people believed that the market was something that has always existed in a quasi-natural state, much like gravity.

It seemed to enjoy a material omnipresence, sharing many characteristics of the forces of nature, warranting a science of its own. The science was first called 'political economy' and then, after roughly 1870, 'economics'. The modern orthodoxy of that science, the neoclassical tradition, has always taken the nature of the market as the central province of economics. In fact, an overview of the history of the first century of neoclassical economics would confirm that its adherents had been much more fascinated with the status and nature of agents than with the structure and composition of markets.

Most of the time, the concept of the market was offhandedly treated as a synonym for the phenomenon of exchange itself. Even, in the few instances when major thinkers in the tradition felt they should discuss the actual sequence of bids and asks in their models of trade - Leon Walras with his TATONNEMENT or Francis Edgewort with his RE-CONTRACTING PROCESS what becomes apparent is that they bore little relationship to the operation of any actual contemporary market. Mid-20th century attempts to develop accounts of price dynamics were, if anything, even further removed from the increasingly sophisticated diversity of market formats and structures, as well as the actual sequence of tasks that markets accomplish. The market in neoclassical economics came to be modeled as a relatively homogeneous and undifferentiated entity.

Yanis Varoufakis, Joseph Halevi and Nicholas J. Theocarakis in MODERN POLITICAL ECONOMICS: MAKING SENSE OF THE POST-2008 WORLD (Varoufakis, Halevi, and Theocarakis, 2011)[1] delve into major economic theories and map out the trajectories that MANAGERIAL CAPITALISM of the NEW DEAL embedded in BRETTON WOODS AGREEMENT's almost centrally coordinated stability's designed disintegration in the 1970s, and then to an intentional magnification of unsustainable imbalances of the 1980s delivered ASSET MANAGER CAPITALISM that globally privatized money creation during the 1990s and beyond to September 15, 2008. The authors' main finding is that any system of ideas whose purpose is to describe capitalism in mathematical or engineering terms lead to inevitable logical inconsistency. The only scientific truth about capitalism is its radical indeterminacy. NEWTONIAN science based economics is an illusion leading one closer to astrology than to astronomy and more akin to a mathematized religion than to mathematical physics.

John Kay and Mervyn King in RADICAL UNCERTAINTY: DECISION-MAKING BEYOND THE NUMBERS broadly agree and write "On many economic issues there will always be an explanation of why the anticipated outcome failed to materialize, and no means of disputing the explanation other than derision. Economists have repeatedly used this excuse, and received that derision. But variants of the falsification argument have enabled economists ever since to deflect criticism of their models for failing to confront the reality of how people behave, and to dismiss critiques of their predictive failures by reference to auxiliary hypotheses. Such a view is closer to religion than science."(Kay and King, 2020).

The economic ideas have always been linked to politics, paradigm shifts in economic theory have been intertwined with configurations of the political landscape. Adam Smith's ideas helped inspire dramatic expansion in free trade in the 19th century. Karl Marx's theories provided the impetus for cataclysmic changes in the 20th century. The neoclassical paradigm laid the intellectual foundations of FINANCIAL CAPITALISM, as John Maynard Keynes's solutions to the GREAT DEPRESSION tempered FINANCIAL CAPITALISM with the directorial role for the state and developed the foundations of MANGERIAL CAPITALISM. It was in this period that the idea of the state as a benevolent guardian of the public interest gained currency.

In the period after World War II, state activism of MANAGERIAL CAPITALISM grew to new heights, until Ronald Reagan and Margaret Thatcher ushered in ASSET MANAGER CATIPALISM in the 1980s after falling under the spell of Milton Friedman's and Friedrich Von Hayek's versions of neoclassical paradigm explains Daniel Stedman Jones in MASTERS OF THE UNIVERSE: HAYEK, FRIEDMAN, AND THE BIRTH OF NEOLIBERAL POLITICS (Jones, 2012)[1] The KEYNESIAN regime ran into trouble in the STAGFLATIONARY 1970s and was superseded by MONETARISM, which was in fact a reversion to PRE-KEYNESIAN orthodoxy about both money and governments.

During the last 40 years the balance of power has shifted decisively from labor to capital; from working class to the business class; and from the old business elites to new financial elites, the asset managers. The homage, NEW CONSENSUS – mixture of 'new' classıcal and 'new' Keynesıan economics - pays to power helped to render the power shift invisible. Whether we consider the quantitative policies taken by Sweden's central bank in the 1980s and 1990s, or the policies of the central banks in the United States, Asian Countries, or Japan, the historic fact is that central banks have been at the center of the boom-and-bust cycles that have plagued the world economy as they increased their independence and decreased their accountability. Between 1982 and 2013, for example, the FED's policy reduced the yield on the 10-year US government bond from 14.6% to 1.9%, and kept it around that until 2020. The independent central banks were instrumental in delivering the shift of power from working class to business class, from the old business elites to new financial elites, the ASSET MANAGERS.

Richard Dobbs, James Manyika and Jonathan Woetzel in NO ORDINARY DISRUPTION: THE FOUR GLOBAL FORCES BREAKING ALL THE TRENDS (McKinsey and Company, 2015)[1] warn us that since the demise of THE GREAT MODERATION in 2008 the world's economy became different. The rise of emerging markets, the accelerating impact of technology on forces of market competition, an aging world population, and the developing new flows of trade, capital, and people have simultaneously exercised a radical and transformative impact on the economies of the world. This radical transformation has concentrated some 440 cities' GDP to be more than half of the global GDP before the third decade of the 21st century, and Tianjin's GDP, for example, is set to be greater than Sweden's. Asia has become the world's largest trading region changing global the movements in capital, goods, people and information, and creating a much more connected world.

At the onset of the GREAT RECESSION after 2008, as house prices sank, and joblessness soared, many commentators concluded that the economic convictions behind the disaster would now be consigned to history. Instead a political class started to blame the government interventions for the disaster and demanded global drive for austerity, stagflation and an international sovereign debt crisis. Philip Mirowski in NEVER LET A SERIOUS CRISIS GO TO WASTE: HOW NEOLIBERALISM SURVIVED THE FINANCIAL MELTDOWN (Mirowski, 2013)[1] finds an apt comparison in this situation in classic studies of cognitive dissonance. He concludes that neoliberal thought has become so pervasive that any countervailing evidence only serves to further convince disciples of its ultimate truth. Once neoliberalism became a THEORY OF EVERYTHING providing a revolutionary account of self, knowledge, information, markets, and government, it could no longer be falsified by anything as mundane as data from the 'real' economy. After financial apocalypse, neoliberalism rose from the dead observes Philip Mirowski.

2. The birth of attention merchants' surveillance capitalism

Fundamental shifts in human affairs come mostly in two guises, as low probability events that could in an instant "change everything", and as persistent, gradually unfolding trends that have no less far-reaching impacts in the long term. Fundamental changes come both as unpredictable discontinuities and as gradually unfolding trends as NIKOLAI KONDRATIEFF argued and paid with his life in Marxist-Leninist Russia in the first quarter of the 20th century. In the Soviet Union, as was in Nazi Germany, the marriage of science and ideology proved fatal for those with different opinions. The gradually unfolding events deserves at least a brief acknowledgement. They are epoch making technical developments: incremental engineering progress, improvements in efficiency and reliability, reduction of unit costs, and gradual diffusion of new techniques, usually following fairly predictable logistic curves are very much in evidence, but they are punctuated by surprising, sometimes stunning discontinuities.

"The idea that social and economic life oscillates around some, not necessarily static, point of equilibrium has been common to both economists and historians. But they have very different views of cycles. For economists, cycles result from some 'shock' to otherwise smoothly functioning systems producing cycles of business activity. The forty-year Kondratıeff cycle, for example, is produced by a surge of technological innovation. Fluctuations may be steep as the economy adjusts to these changes, but they have not been sufficiently long-lasting to call into question the idea of progress itself.", writes Robert Skidelsky in what's wrong wıth economıcs: a prımer for the perplexed (Robert Skidelsky, 2020). "At the very birth of evolutionary biology, then, the principles of political economy were in attendance. Through the next century, they appeared to knit tighter into each other, so that the impulse to discover how society ought to be organized was inseparable from the impulse to discover how nature organized itself.

There was the conundrum of the optimum economy, and evolutionary biology managed to fill the sails of different doctrines. The philosopher Herbert Spencer, among many others, concluded that the ruthless individualism of nature recommended a similar laissez-faire model for society; the phrase he coined "survival of the fittest", was adhered as much to capitalism s to evolution.", informs Samanth Subramanian in A DOMINANT CHARACTER: THE RADICAL SCIENCE AND RESTLESS POLITICS OF J. B. S. HALDANE (Subramanian, 2019).

For the historians, "While history often consists of long-term trends, occasionally a proverbial meteorite arrives: an unforeseen shock that stimulates enormous change in a very short period of time. One of the clearest examples is World War I, which precipitated the breakup of several empires, the emergence of the first great communist power, and the disintegration of class and gender hierarchies all over the world. Whereas in Britain the democratization of financial markets took two centuries, World War I brought it to the United States in the space of only a few years. In the United States, the decade following the conclusion of the war was then characterized by abundant money, as the newly unlocked savings of the middle classes continually looked for new investment outlets. When a technological spark eventually brought this money into the highly leveraged market for equities, the result was a bubble that encompassed the entire stock market and culminated in one of history's most spectacular crashes. Like many financial developments throughout history, the democratization of US financial markets came about as part of an effort to raise money to pay for war. The United States entered World War I in April, 1917, believing that its outcome hinged on its ability to mobilise its forces as quickly as possible, creating urgent funding requirements for the government. Expenditure rose from $1.9billion in 1916 to $12.7billion in 1917, and was to rise further to $18.5billion in 1918, far greater sums than could be funded through taxes alone. Woodrow Wilson's administration concluded that the best way was to fund the war effort was to sell vast amounts of bond to the American public. …. The recently established Federal Reserve began accepting LIBERTY BONDS as collateral, giving financial institutions a strong incentive to hold them. These institutions then acted as a distribution network, with investors able to purchase the bonds at their local branch. Many institutions also allowed investors to buy the bonds on credit.", wrote William Quinn and John D. Turner in BOOM AND BUST: A GLOBAL HISTORY OF FINANCIAL BUBBLES (Cambridge University Press, 2020) "The decade before the crash saw a continuous increase in marketability, as a series of reforms and innovations made it much easier to buy and sell securities. The first of these was the financial network set up to distribute the LIBERTY BONDS, which allowed them to be bought in local bank branches, department stores and through payroll deductions. After the war, private banks moved to replicate this network in an attempt to tap into the market of small investors. The total number of brokerage offices rose from 706 in 1925 to 1,658 in 1929, allowing investors without going near Wall Street. The NATIONAL CITY COMPANY effectively became a financial chain store, selling corporate bonds, foreign bonds and common stocks all over the country. This was accompanied by marketing campaigns that aimed to educate the public in the basics of investments. On secondary markets, the transaction costs were remarkably low in the second half of the 1920s. Traders also benefitted from the expansion of communications technology. For the purpose of explaining the stock market bubble, the most significant form of credit growth was in broker loans. Investment trusts had barely existed in the United States before 1920, but when they did arrive, they were much riskier entities than they had been in the UK. Many were enormously leveraged. The number of these trusts grew from 40 in 1021 to over 750 in 1929, when they issued more new capital than any other sector. Trading on margin was just as common among individual traders, who borrowed from brokers, who in turn borrowed from banks. The spark for the bubble came from technological change. American society, as well as its economy, was transformed by electrification in the years preceding the crash. New technology sparked the bubble in two ways. First, it provided companies with extraordinary profits in the mid-1920s, much of which was paid out to shareholders. Second, new technology provided investors with a powerful rationalization for the fact that stock prices far exceeded the level implied by traditional metrics. In fact, the crash was neither a response to a specific incident nor a mystery: it was simply a consequence of the market's underlying structure. The quantity of outstanding broker loans in the autumn of 1929 meant that any sufficient fall in prices would lead to a significant number of margin call. This in turn would force traders to liquidate, depressing prices further." (Cambridge University Press, 2020).

Economics, having taken its cue from Isaac Newton's physics, is an equilibrium system, disturbances are to be short and self-correcting. It is centered on equilibrium: an economy's natural resting state. Solving a set of equations that describes a market, conceived of as populated by predictably self-interested individuals who face various constraints, yields that equilibrium, the prices that balance supply and demand. Physicists have over the centuries used mathematics to understand the nature of gravity, light, electricity, magnetism and nuclear forces. Analytic solutions were achieved when their equations were linear, the noise GAUSSIAN, and the variables separable. Our world was written by them in the passive voice: rivers flow, rocks fall, planets orbit. There are no doings. Only happenings.

As Edward Fullbrook warns in market-value: ıts measurement and metrıc (Fullbrook, 2019), there are two ways of using mathematics relative to an empirical phenomenon. One is to choose a mathematical structure and then make assumptions about the empirical structure so as to make two structure homomorphic. This is the methodology of orthodox neoclassical economics that generates mathematical models from which concepts can be defined and deductions made. But that is not the methodology of NEWTONIAN PHYSICS. The second way is what Newton called 'experimental philosophy'. Instead of beginning with a mathematical structure, it begins by observing and describing an empirical structure and then looks for or invents as Newton's calculus a homomorphic mathematical structure. It is then this empirical foundations, rather than the axioms of mathematics, that concepts are defined and deductions made. That is neoclassical economists' neglect.

Jeremy Bentham's identification of utility with pleasure or pain was the orthodox position among early Victorian economists, but a generation of reforming economists led by Stanley Jevons showed that one can often dispense with appeals to utility altogether by carefully considering what happens at the margin. In the analytic practice inaugurated by the marginalists, Walras, Jevons, Menger and their followers, mathematics acquired a central function. Marginalists proposed to view the economy as a set of connected markets. Supply responds to demand, and demand to supply. Their reciprocal balancing forms the essence of the operation of a market. The medium through which supply and demand adjust to each other in the system of relative prices. The explanation of relative prices became the hypothetical exercise around which marginalism developed. It was hypothetical because the analytic apparatus that the marginalists produced has never been used to explain actual relative prices in any real economy. Individual desires for consumption or gain drove supply and demand: hence the methodological individualism that marked, from the beginning, this approach to economics. The perspective was that of the individual making choices about the disposition of scarce resources that would most efficiently achieve his goals of consumption or gain. Its radical simplification allowed much of its analysis to take mathematical form. Mathematics served as a favored instrument for a practice of economics, one that was closer to logic than to casual science, in model-building into which post-marginalist economics devolved. Mathematics remained the fundamental tool, exposing the implications of each model of a piece of economic activity on the basis of factual stipulations and casual theories, as well in the light of normative commitments, supplied from outside the apparatus of economic analysis. The use of mathematics would need to have a much more intimate relation to casual inquiry than it does in established economics, anticipating and provoking casual views, as mathematics has in the history of fundamental physics, not just representing them retrospectively. The limit of mathematics' usefulness would lie in the exploration of what is qualitative rather than quantitative (as in the discontinuities among different levels of breakthrough of demand-side and supply-side constraints on growth); in what depends on historical path dependence rather than on timeless economic truth; and in what involves institutional structure and institutional change rather than the allocation and reallocation of resources with a given institutional framework.

Furthermore, we are in a world of living creatures that construct themselves. What neoclassical economic theory misses is the idea of a system that constructs itself. The rhythmic character of economic life, the waves of innovation and destruction, the rise and fall of systems of political economy do not abide well with the conditions neoclassical economic theory portrays, because network equations turn out to be nonlinear, noise associated with them non-Gaussıan, and variables non-separable. They do not have explicit solutions. "Evolution is about the survival of the fittest. Entities that promote

their fitness consistently will therefore survive at the expense of those that promote their fitness only intermittently. When biological evolution has had a sufficiently long time to operate, it is therefore likely that each relevant locus on a chromosome will be occupied by the gene with maximal fitness. Since a gene is just a molecule, it can't change to maximize its fitness, but evolution makes it seem as though it had. This is a valuable insight, because it allows biologists to use rationality considerations to predict the outcome of an evolutionary process, without needing to follow each complicated twist and turn that the process might take. When appealing to rationality in such an evolutionary context, we say that we are seeking an explanation in terms of ultimate causes rather than proximate causes." reminds Ken Binmore in RATIONAL DECISIONS (Princeton University Press, 2009).

"Cycles as conceived by historians are more like civilizational cycles. They may be triggered by business crisis, but their origin is existential, coming from the failure of society's central institutions. Abstracting from technology, historians' cyclical theories have no built-in notion of progress. Technological progress is exogenous and unpredictable. History itself discloses no clear pattern of improvement. It swings backwards and forwards along. It does not repeat itself, but it rhymes. In the typical historical cycle, societies are said to swing like pendulums between alternating phases of vigor and decay, progress and reaction, hedonism and puritanism. Each outward movement produces a crisis of excess which leads to a reaction. The equilibrium position is hard to achieve and unstable. History cannot be used to predict the future, but can indicate trends and inevitable reactions against them. Typically, the historians' cycles are generational, with children reacting against the beliefs of their parents." notes Robert Skidelsky. (Skidelsky, 2020).

Some post-2008 financial crisis economists draw on strands of the discipline less enamored of equilibrium. Joan Robinson worried that equilibrium models understated the role of history in determining outcomes. Joseph Schumpeter saw the economy as undergoing constant change powered by innovation. Friedrich Hayek wrote on how the separate actions of individuals could generate 'spontaneous order' of incomprehensible complexity.

A famous economic theory of long cycles is the kondratieff cycle, a long wave of 40 or 50 years, which starts with a cluster of new technologies and exhausts itself when they have been used up. "This conjecture would match very well with the theory of long waves of economic development, particularly known through the work of the Russian economist Kondratieff and extended by very different economists, from the Marxist E. Mandel to mainstream economists such as J. Forrester and J.J. van Duijn. According to this theory, the economy not only reveals short trade cycles between five and seven years long on average, but also long waves of about 50 years with an upturn and downturn phase that are mainly launched by the arrival of new technologies. In the last two centuries, we have witnessed four waves dominated by: the steam engine (roughly 1800-1850); electricity and media of the first communication revolution (1850-1900); oil, steel, chemicals and combustion engine (1900-1950); electronically controlled machines, followed by transistor and computer (1950-2000), and now running; automatically controlled machines (robots), artificial intelligence, bio and nano-technology (2000-2500)." clarifies Jan van Dijk in the network society (Dijk, 2020).

Schumpeter drew on this idea in his depiction of capitalism's cycles of creation and destruction. In Schumpeterian view, capitalism is a dynamic disequilibrium system. The new only rarely supplements the old; it usually destroys it. As Carl Benedikt Frey explains in THE TECHNOLOGY TRAP: CAPITAL, LABOR, AND POWER ON THE AGE OF AUTOMATION (Princeton University Press, 2019)[1], the old, however, does not, as it were, simply give up but rather tries to forestall death or co-opt its usurper – a la KRONOS – with important implications.

There is neither a unique full employment equilibrium nor the variety of equilibria posited by Keynes. Nevertheless, there is a potential meeting between Keynes and Schumpeter, since Schumpeter, like the earlier generation of REAL BUSINESSS CYCLE THEORISTS, would not have denied that stabilization policy could make rocking less violent. Within the long cycles are shorter cycles of boom and bust, lasting 8 to 10 years. Lacking proper scientific explanation Paul Samuelson called cycle theories "science fiction", nevertheless cycles have had great influence on macroeconomic policy. Typical macroeconomic constructions, such as the CYCLICALLY ADJUSTED BUDGET DEFICIT, refer to short cycles of definite duration, which oscillate round some 'normal' or 'long-run' situation.

"The statistical algorithm identifies four troughs in global economic activity since 1960, and these correspond to declines in the world real gross domestic product (GDP) per capita and constitute global recessions: 1975, 1982, 1991, and 2009 the dates of peaks in the global business cycle are 1974, 1981, 1990 and 2008." wrote M. Ayhan Kose and Marco E. Terrones in COLLAPSE AND REVIVAL: UNDERSTANDING GLOBAL RECESSIONS AND RECOVERIES (International Monetary Fund, 2015).

David Hume, in the tradition of British Empiricism, thought of a passive observing mind/brain in a vat and wondered how that observing mind could have reliable knowledge of the world. He rightly noted that from what is observed to be the case, one cannot deduce what ought to be the case. One cannot deduce an ought from an is. "In the 18th century David Hume argued that we can never be certain about interpreting causation. If we find that A seems invariably to be followed by B, we might infer that A causes B, but that inference can't be proved correct. In CRITIQUE OF PURE REASON (1781) Immanuel Kant went further, saying that we have no access to the world that is not mediated by experience. He called the world as it 'is' the noumenal world or Ding an sich: the 'thing in itself'. But all we can know is phenomenal world: that is registered by the senses and the mind's tool of understanding. This holds our conception of the world hostage to fallible powers of perception and reasoning. If we become capable of reasoning more precisely the phenomenal world changes. Most scientists feel instinctively that experience and consciousness should be a secondary phenomenon, a mere mediator rather than the primary ingredient for cooking up a concept of what reality could mean." wrote Philip Ball in BEYOND WEIRD: WHY EVERTHING YOU THOUGHT YOU THOUGHT YOU KNEW ABOUT QUANTUM PHYSICS IS DIFFERENT (Ball, 2018).

Yet, ever since David Hume, economists have distinguished between short-run and the long-run effects of economic change, including the effects of policy interventions. The distinction has served to protect the theory of equilibrium, by enabling it to be stated in a form which took some account of reality. In economics, the short-run now typically stands for the period during which a market or an economy of markets temporarily deviates from its long-term equilibrium position under the impact of some 'shock'; like a pendulum temporarily dislodged from a position of rest. This way of thinking suggests that governments should leave it to markets to discover their natural long-run equilibrium positions. Reminding us of the harsh reality that in the long-run we will all be dead, John Maynard Keynes pointed out that the long-run may be too long to be relevant. Historical cycles, on the other hand, refer to disturbances of a moral, socio-political, rather than technological equilibrium. That is; they embed technological innovation within the wider frame of political and social change. Societies are said to swing like pendulums between alternative phases of vigor and decay, progress and reaction, prodigality and puritanism. Each expansive movement produces a crisis of excess that leads to a reaction. The equilibrium position is hard to achieve and is always unstable.

By far the most important concatenation of these fundamental advances took place between 1867 and 1914, when electricity generation, steam and water turbines, internal combustion engines, inexpensive steel, aluminum, explosives, synthetic fertilizers, and electronic components created the technical foundations of the 20th century. A second remarkable saltation took place during the 1930s and 1940s with the introduction of gas turbines, nuclear fission, electronic computing, semiconductors, key plastics, insecticides, and herbicides. The history of jet flight is a good illustration of the inherently unpredictable nature of these rapid technical shifts.

Before the scientific revolution of the 17th century, there was no suggestion that there might be simple, orderly laws underpinning the confusion of the world, and the nearest anyone came offering a reason for the behavior of wind, and weather, the occurrence of famines, or the orbits of planets was that they resulted from the whim of God, or gods. Newton made the universe seem an orderly place, with no room for interference from capricious gods. He provided laws of motion, which describe the behavior of moving objects in the laboratory, or in the world at large, or in the solar system and beyond, and which, by extension, must also be thought of as universal laws, applying everywhere and at all times.

The kinetic theory of gasses was a significant example of how the universal laws of physics brought order out of chaos. The term "gas" was coined by Jan van Helmont from the Greek word for chaos. It was Isaac Newton's fellows' world-view that unleashed a theory of progress with human creativity and free will at its core.

Isaac Newton worked out the mathematical basis of physics, Rene Descartes,

its dualist philosophy, and Francis Bacon's the experimental method that subsequently led science to reach its heights. The experimental method that delivered "certain" results in physics came to be called REDUCTIONISM. REDUCTIONISM assumes that matter is the basis of all existence and that material world is composed of a multitude of separate objects assembled into a huge structure. Consequently, complex phenomena can be understood by reducing them to their basic building blocks, and by looking for the mechanisms through which these building blocks interact. Although physics led the way, the reductionist methodology eventually permeated all the sciences.

With the triumphs of Descartes, Newton, and Laplace, we have come to regard physics as the answer to our questions about what reality "is". In that search, we have come to think of the world as a vast "machine". This fundamental framework, extended by specıal and general relatıvıty, quantum mechanıcs, and quantum fıeld theory alter some of the basic deterministic aspects of Newtonıan physics but not the view of reality as a giant "machine". Evolving life is not a "machine", neither is its biosphere. Unlike physics where laws hold sway, no laws at all entail the becoming of the biosphere.

We do not know what shall become as the biosphere evolves and shapes its own future in ways we cannot state in advance. This lawless emergence is contingent yet not random. Biosphere constructs itself and does so into a biosphere of increasing diversity. The living world can become more diverse and complex and in an ongoing way creates its own potential to do so. That requires harnessing of the release of energy to build order faster than that order can be dissipated by the second law of thermodynamics.

Much of the scientific method relied on taking a reductive stance toward nature, breaking the complex into simple basic units. In physics, this meant seeing objects as aggregates of individual atoms. In human affairs, it meant building a notion of society based on an understanding of the individual. Thomas Hobbes, thus began his political treatise with the individual, a radical and strikingly modern step. According to the Christian doctrine dominating Hobbes's day, societies were organic wholes with individuals as part of the body of Christ. Individuals ultimately derived their identity from that larger collective vision. Each part had no shape except by relation to the social whole.

Hobbes reversed all that, putting the individual before society and seeing society as nothing more than aggregate of individuals. Hobbes's individuals were self-interested and social. Just as the atoms of the physics of his day were constantly in in motion, so too were Hobbes's individuals propelled by internal drives that kept them in constant motion. The inevitable result was conflict. Leading in his vision of "war of all against all".

Sigmund Freud in cıvılızatıon and ıts dıscontents (2017) argued that civilization stems from primordial guilt that first arose with patricide, perhaps as a band of sons rose up to kill their father. Freud speculated that in the aftermath of that bloody act, feelings of shame so overwhelmed them that they formed laws and social institutions to prohibit such acts. Freud thus located our civilizing tendency in guilt, an emotional impulse. Thomas Hobbes characterized man in terms of his strength of body, his passions, his experience, and his reason. Hobbes believed humans were rational calculators of self-interest, and for Hobbes rationality ultimately saves humans from themselves. Thomas Hobbes's LEVIATHAN treats a society like a single person written large. Karl Marx does the same for capital and labor. Reason moves Hobbes's individuals, driven by the selfish desire for self-preservation, to relinquish liberty for security, ceding absolute control to a sovereign, a LEVIATHAN, in exchange for security. Ken Binmore in RATIONAL DECISIONS remind: "In orthodox decision theory, the decision maker's reason is identified with the manner in which she takes account of her preferences and beliefs in deciding what action to take. The orthodox position therefore confines rationality to the determination of means rather than ends. To quote David Hume: 'Reason is and ought to be, the slave of passion.' As Hume extravagantly explained, he would be immune to accusations of irrationality even if he were to prefer the destruction of the entire universe to scratching his finger. Some philosophers hold to the contrary that rationality can tell you what you ought to like. Others maintain that rationality can tell you what you ought to choose without reference to your preferences. For example, Kant tells us that rationality demand that we honor his categorical imperative, whether or not we like the consequences." (Princeton University Press, 2009). "Rationalism in philosophy consists of arriving at substantive conclusions without appealing to any data. If you follow the scientific method, you are said to be an empiricist rather than a rationalist. But only creationists nowadays feel any urge to persecute scientist for being irrational." (Princeton University Press, 2009).

The basis of life together is this Hobbesian social contract, in which the state exists only to safeguard the individual's self-preservation. John Locke retained Hobbes's ideas of social contract as the glue of society, but attacked Hobbes's vision of absolute monarchy, arguing that it simply transferred the war of all against all to one between the monarch and his subjects. Following the dominant features of Newtonian mechanics, with its immutable laws governing the relationship between separate bodies, Locke developed an atomistic view of society, describing it in terms of its basic building blocks – individual property-acquiring human beings. Just as physicists reduced the properties of gases to the motion of their atoms, or molecules, so Locke attempted to reduce the phenomena observed in society to the behavior of discrete individual bodies. Thus, Locke argued for a limited, constitutional government, which in essence the modern limited, liberal state. Whereas Hobbes believed that only absolute rule could curb self-interest, Adam Smith saw self-interest as the basis or social order. The invisible hand of the marketplace thus replaced the sovereign LEVIATHAN, and common interest simply flowed out of collective pursuit of self-interest. So was Smith's fantasy that started the battle between the market and the state. "Agency-problem" ridden multinational corporations, not Smithian atomistic individuals, with their global financial networks emerged to be the market's modern face.

In turnıng poınt: scıence, socıety, and the rısıng culture (Capra, 1982), Fridtjof Capra contends that the NEWTONIAN view of scientific method has crashed and that the first discipline to crash has been physics itself, where CARTESIAN philosophical foundation and the reductionist methodology had seemed most secure. First, quantum theory played havoc with Descartes's certainty principle, and the second discovery pertaining to the nonlocal connections of individual events abolished Descartes's separation of mind from matter. In the ecology of law: toward a legal system ın tune wıth nature and communıty Fritjof Capra and Ugo Mattei add that "Western jurisprudence, together with science, has contributed significantly to the mechanistic worldview; since modernity produced the materialistic orientation and extractive mentality of the Industrial age, which lies at the root of today's global ecological, social, and economic crisis, both scientists and jurists must share some responsibility for the current state of the world. …. At the forefront of science, a radical change of paradigms, - from a mechanistic to a systemic and ecological worldview – is now emerging. The very essence of this paradigm shift is a fundamental change of metaphors: from seeing the world as a machine to understanding it as a network of ecological communities. Moreover, the science of ecology has shown us that nature sustains the web of life through a set of ecological principles that are generative rather than extractive."(Capra and Mattei 2015).

In this 18th century system of the world, Newton brought together two themes. Embodied in his calculus and physics, one Newtonian revelation rendered the physical world predictable and measureable. Craving the authority of science, economists then mimicked Newton's laws of motion in their theories, describing the economy as if it were a stable, mechanical system. In the late 19th century, a handful of mathematically minded economists set out to make economics a science as reputable as physics, turned to differential calculus to describe the economy with a set of axioms and equations.

Just as Newton had uncovered the physical laws of motion that explained the world from the scale of a single atom to the movement of the planets, the mathematically minded economists sought to uncover the economic laws of motion that explained the market, starting with a single representative consumer and scaling up to national output. Thus, 150 years of economic theory biased our understanding with static mechanistic models and metaphors, when the economy is better understood as a complex adaptive system, made up of interdependent humans in a dynamic living world. The individual is not only embedded within a system but is directly involved in that system's self-organization. Long before Darwin, Immanuel Kant understood this. "An organized being then, has the property that the parts exist for by means of the whole." KANTIAN WHOLE.

Another, less celebrated, was Newton's key role in establishing the trustworthy GOLD STANDARD, which made economic valuations as calculable and reliable as the physical dimensions of items in trade. For 200 years after 1717, except for its suspension in the Napoleonic wars, Newton, as master to the Royal Mint, having fixed the value of the pound to gold, the sterling pound, based on chemical irreversibility of gold, became the stable and reliable monetary Polaris. Newton's attempted and failed alchemical endeavors to reverse-engineer gold so that it could be made from base metals such as lead and mercury yielded crucial knowledge for his defense of the gold based pound

Newton's regime rendered money essentially as irreversible as gold, as irreversible as time itself as measurement of economic transactions.

These two concatenations substituted continuous processes for discrete production and gave us the classic image of wheels of industry, rolls of paper, spools of thread, ribbons of steel, classic assembly line of films like Charlie Chaplin's modern times. In the preindustrial epoch, technology was limited to the tools and structures that humans could create with their own hands. Nature remained in control. In the industrial epoch, machines were introduced, starting with simple machine tools, that could reproduce other machines. Nature began falling under mechanical control. Such industries represented only part of industrialized nations' output, but the ideal of continuous process technology inspired capitalists and socialists alike. In the third epoch, digital codes, starting with punched cards and paper tape, began making copies of themselves. Powers of self-replication and self-production that had so far been the preserve of biology were taken up by machines. Nature seemed to be relinquishing control. In the centuries of continuous process technology, it was manufacturers, refiners, and distributors who seemed to have excessive power over information, now a few disruptive platform companies do. Late in this epoch, the proliferation of networked devices, populated by metazoan codes, took another turn. Mass production economy based on cheap fossil fuel has evolved into information economy based on cheap micro-electronics in the 21st century. Industrial civilization flourished at the expense of nature started to threaten the ecology of the living Planet Earth.

George Dyson in Analogıa: The emergence of technology beyond programmable control tells: "Nature uses coding, embodied in strings of DNA, for the storage, replication, modification, and error correction of instructions conveyed from one generation to the next, but relies on analog coding and analog computing, embodied in the brains and nervous systems, for real-time intelligence and control. Coded sequences of nucleotides store the instructions to grow a brain, but the brain itself does not operate, like a digital computer, by storing and processing digital code. …. In a digital computer, one thing happens at a time. In an analog computer, everything happens at once. Brains process three-dimensional maps continuously, instead of processing one-dimensional algorithms step by step. Information is pulse-frequency coded, embodied in the topology of what connects where, not digitally coded by precise sequences of logical events. "The nervous system of even a very simple animal contains computing paradigms that are orders of magnitude more effective than are those found in systems built by humans,' argued Carver Mead, a pioneer of the digital microprocessor, urging a reinvention of analog processing in 1989. …. Electronics underwent two critical transitions over the past one hundred years: from analog to digital and from high-voltage, high-temperature vacuum tubes to silicon's low-voltage, low-temperature solid state. That these transitions occurred together does not imply a necessary link. Just as digital computation was first implemented using vacuum tube components, analog computation can be implemented, from bottom up, by solid state devices produced the same way we make digital microprocessors today, or from top down through the assembly of digital processors into analog networks that treat the flow of bits not logically but statistically: the way a vacuum tube treats the flow of electrons, or a neuron treats the flow of pulses in a brain. …. The vacuum tube, treating streams of electrons as continuous functions, was an analog device. The logical processing of discrete pulses of electrons had to be imposed upon it. …. In the analog universe time is a continuum. In the digital universe, time is an illusion conveyed by sequences of discrete, timeless steps." (Dyson, 2020).

"The most basic difference between human cognition and computer/medium processing can be attributed to the fact that human perception and cognition are situated physically in a tangible world. A human being has an active and autonomous relationship to its environment. This is of crucial importance to the versatile perception and cognition in the so-called 'perceptual cycle'. The basic principles of this perceptual cycle are perceptual activities that are controlled by continuously changing mental schemata. This is caused by the direct intentionality of the human mind. Intentionality is inspired by the needs and values of human beings as biological and social beings in a particular environment. This is the basic principle used by neurobiologist Gerald Edelman and his Neurosciences Institute. Edelman's work, summarized and popularized in his books BRIGHT AIR, BRILLIANT FIRE: ON THE MATTER OF THE MIND (Basic Books, 1993)[1], and with Giulio Tononi, A UNIVERSE OF CONSCIOUSNESS: HOW MATTER BECOMES IMAGINATION (Adelman and Tononi, 2000)[1] rejects the principle of most cognitive psychologists that the human brain can be compared to a computer or to a power plant of neurons. He claims it is more like an organic jungle of continuously changing groups and connections of neurons that are unique for every human being. They are only partly specified by genes. The needs every human being appears to have in their ongoing interaction with the environment cause a continuous selection of neurons in the Darwinian sense, changing the human brain ceaselessly. A process of trial and error produced by these needs shapes the brain. The workings of the human brain should not be separated into the functioning of hardware (brain) and software (mind), as most cognitive psychologists do. According to Edelman, the complete human brain/mind, but obviously not particular thoughts, can be explained by neurobiology." (Dijk, 2012).

"Perception and processing in computers or other media, in the other hand, can only start with some kind of derived intentionality. Computers are programmed by others and only reproduce or present programs. The principle of computer processing is programmed instruction following algorithms, not neural selection as in mental processing. Computers and media are programmed for various purposes and environments. So to some extent they are context-free and abstract. They are intended (instructed by a command) and they follow a rational planning model of the human mind. In her book, PLANS AND SITUATED ACTIONS:THE PROBLEM OF HUMAN-MACHINE COMMUNICATION, Lucy Suchman (Suchman,1987)[1] has severely criticized this model. In her empirical, anthropological study of the ways people use modern electronic equipment in everyday-life, Suchman came to the conclusion that people do not use this equipment according to a certain plan, the way developers of this equipment expect them to do. Planning models of human action and thinking do not match the reality of 'situated action', which Edelman claims is inspired by neural selection following needs. Large parts of these selections are unconscious, in this way raising doubts about the predominance of conscious will. Suchman feels plans are merely an anticipation and a reconstruction of action. They are a way of thinking, not a real-life representation of action. "Situated action is an emergent property of moment-by-moment interactions between actors and between actors and the environment of their actions. This interaction has four features that go substantially beyond the three levels of interactivity that computers and media have been capable of supporting so far (two-way communications, synchronicity and, to some extent, control from both sides." (Dijk, 2012).

In a world beyond physıcs: the emergence & evolutıon of lıfe (Kauffman, 2019), Stuart A. Kauffman sums the economy to be a network of complements and substitutes that he calls the ECONOMIC WEB. Like the biosphere, ECONOMIC WEB's evolution cannot substantially pre-tested, and is "context dependent". And creates its own growing "context" that subtends its "adjacent possible". The adjacent possible is what can arise next in this evolution. This evolution is sucked into the very adjacent possible opportunities it itself creates. And Ken Binmore adds: "Evolution is about the survival of the fittest. Entities that promote their fitness consistently will therefore survive at the expense of those that promote their fitness only intermittently. When biological evolution has had a sufficiently long time to operate, it is therefore likely that each relevant locus on a chromosome will be occupied by the gene with maximal fitness. Since a gene is just a molecule, it can't choose to maximize its fitness, but evolution makes it seem as though it had. This is a valuable insight, because it allows biologists to use rationality considerations to predict the outcome of an evolutionary process, without needing to follow each complicated twist and turn that process might take. When appealing to rationality in such an evolutionary context, we say that we are seeking an explanation in terms of ultimate causes rather than proximate causes." (Princeton University Press, 2009). David Eagleman in lıvewıred: the ınsıde story of the ever-changıng braın (Eagleman, 2020) adds: "Our genetics bring about a simple principle: don't build inflexible hardware; build a system that adapts to the world around it. Our DNA is not a fixed schematic for building an organism; rather, it sets up a dynamic system that continually rewrites its circuitry to reflect the world around it and to optimize its efficacy within it. Neurons in the brain are locked in competition for survival. Just like neighboring nations, neurons stake out their territories and chronically defend them. They fight for territory and survival at every level of the system: each neuron and each connection between neurons fights for resources. As the border wars rage through the lifetime of a brain, maps are redrawn in such a way that experiences and goals of a person are always reflected in the brain's structure."

The 80-year history of Information technology is an example. While the first industrial age emerged from a mastery of the masses and theories of Isaac Newton, the computer age sprang from a practical grasp of the particles and paradoxes of the quantum theory of Erwin Schroedinger, Werner Heisenberg, and Albert Einstein. As World War II drew to a close, the race to build the hydrogen bomb was accelerated by von Neumann's desire to build a computer, and push to build von Neumann's computer was accelerated by the race to build

a hydrogen bomb. Computers were essential to the initiation of nuclear explosions, and to understanding what happens next. Numerical simulation of chain reactions within computers initiated a chain reaction among computers, with machines and codes proliferating as explosively as the phenomena they were designed to help us understand. This numerical simulation approximated the physical reality of a nuclear explosion closely enough to enable some of the first useful predictions of weapons effects. It is no coincidence that the most destructive and the most constructive of human inventions appeared at exactly the same time. Hopefully, the collective intelligence of computers could save us from the destructive powers of the weapons they had allowed us to invent.

"Godel set the stage for the digital revolution, not only by redefining the powers of formal systems – and lining things up for their physical embodiment by Alan Turing–but by steering von Neumann's interests from pure logic to applied. It was while attempting to extend Godel's results to a more general solution of Hilbert's Entscheıdungsproblem – the "decision problem" of whether provable statements can be distinguished from disprovable statements by strictly mechanical procedures in a finite amount of time – that Turing invented his unıversal machıne. All the powers – and limits to those powers – that Godel's theorem assigned to formal systems were captured by Turing's unıversal machıne, including von Neumann's version. Godel proved that within any formal system sufficiently powerful to include ordinary arithmetic, there will always be undecidable statements that cannot be proved true, yet cannot be proved false. Turing proved that within any formal (or mechanical) system, not only are there functions that can be given finite description yet cannot be computed by any finite machine in a finite amount of time, but there is no definite method to distinguish computable from non-computable functions in advance. Godel assigned all expressions within the language of the given formal system unique identity numbers–or numerical addresses – forcing them into correspondence with a number bureaucracy from which it was impossible to escape. The Godel numbering is based on an alphabet of primes, with an explicit coding mechanism governing translation between compound expressions and their Godel numbers – similar to but without the ambiguity that characterizes the translations from nucleotides to amino acids upon which protein synthesis is based. This representation of all possible concepts by numerical codes seemed to be a purely theoretical construct in 1931. What Godel and Turing proved is that formal systems will, sooner or later, produce meaningful statements whose truth can be proved only outside the system itself.", explained george dyson in turıng's cathedral: the orıgıns of the dıgıtal unıverse (Dyson 2012). "Leo Szilard, John von Neumann, Eugene Wigner, Theodore von Karman and Edward Teller were five Hungarians whose migration to America in 1930s sparked the development of nuclear weapons, digital computers, and the intercontinental ballistic missile. Leo Szilard analyzed the thermodynamic consequences of minimal physical representation of what we now term one "bit" of information, but it would be another two decades until the current terminology took hold. Szilard's insights, along with those of communication theorists Harry Nyquist and Ralph Hartley, influenced Neumann and Wiener, anticipating Claude Shannon's formulation of information theory in 1948. After helping to bring nuclear weapons into existence, Szilard campaigned against them for the rest of his life" (Dyson, 2020). "The fundamental, indivisible unit of information is the bit. The fundamental indivisible unit of digital computation is the transformation of a bit between its two possible forms of existence as structure (memory)or as sequence (code). This is what a TURING MACHINE does when reading a mark (or the absence of a mark) on a square of tape, changing its state of mind accordingly, and making (or erasing) a mark somewhere else. To do this at electronic speed requires a binary element that can preserve a given state over time, until, in response to an electronic pulse or some other form of stimulus, it either changes or communicates that state. Most of the essential elements or "cells" in the machine are a binary or "on-off" nature." (Dyson, 2012).

"MATHEMATICAL AND NUMERICAL INTEGRATOR AND COMPUTER (MANIAC) became operational in 1951 by mingling of data with instructions and breaking the distinction between numbers that mean things and numbers that do things. Hydrogen bomb was a result. Until stored-program digital computers, numbers represented things. With coded instructions, termed "order codes", were given the power to do things – including, the power to invoke another instruction or make copies of themselves. Strings of bits gained the power of self-replication, just like strings of DNA. Thus began a chain reaction, with the order codes persisting largely unchanged., like the primordial alphabet of amino acids, over seventy years since they were released. The MANIAC's descendants, replicated first in vacuum tubes, next in discrete semiconductors, and now in monolithic silicon, are characterized by word length, governing how much memory they can address, and clock speed, governing how many instructions they can execute in a given period of time.

The underlying "clock", however, are there not to measure time but to serve as a clock work escapement regulating an orderly sequence of events. In the digital universe, time as we know it does not exist. In the analog universe, time is a continuum. Any two moments, no matter how close, have other moments in between. In the digital universe, there is no continuum, only finite if unbounded series of discrete steps." (Dyson, 2020). Shortly later, IBM made the first commercial machines, expecting to sell only a few. But the mainframe sold widely, and with the invention of the microchip, paved the way for the personal computer.

Chip-making was an in-house affair for Americans at the onset of the industry until 1961 when FAIRCHILD SEMICONDUCTOR began assembling and testing products in Hong Kong mostly to arbitrage labor costs. In 1987, when FUJITSU attempted to buy FAIRCHILD SEMICONDUCTOR President Reagan's secretary of commerce and secretary of defense objected to the deal on national security grounds, claiming the US military could not be dependent on foreign powers for crucial communications technology. In 1988, CONGRESS passed the exon-florıo amendment, which further empowered the president to block such mergers or acquisitions of domestic firms by foreign companies if they harm national security. Internationalization of the production processes has accelerated as microchips have become more complicated and more manufacturing processes have been outsourced to specialized firms that emerged in Asia. In 1971, INTEL developed a general-purpose chip, or microprocessor. A single device that could serve many functions paved the way for the construction of a mini-computer. At XEROX PARC in 1972, Butler Lampson built the ALTO, a machine which differs little in appearance from a modern desktop computer. Lampson's team added many of the features we take for granted today. While XEROX was perfecting the ALTO, personal computers were developed by hobbyists. The ALTAIR desktop, a self-assembly kit for $400 was first advertised in popular electronıcs magazine in 1974. Home computers used tape cassettes for storage and television sets as monitors. AT&T and SONY sold desktop machines. All these initiatives failed.

In 1981, IBM launched a personal computer, simultaneously abbreviated to PC and achieved world-wide acceptance. What many users thought the performance of the PC was not at par with the machines already in the market did not matter. More users begot more users. Network effect. IBM outsourced PC's operating system to a small company, MICROSOFT. When IBM attempted to regain control with a new and more sophisticated operating system, OS/2, it was too late. MICROSOFT's MS-DOS powering WINDOWS 3.1 was everywhere. Meanwhile, Steve Jobs and Steve Wozniak began assembling APPLE machines in 1976 in Job's garage. Although Mıcrosoft understood that ease of use was important for commercial success. It was Jobs who extended this vision further and conceived a computer that you could use without understanding anything about computers. Jobs drew on another invention from XEROX PARC- the graphical interface. APPLE integrated software and hardware. APPLE's determination to maintain its proprietary system failed in the face of widespread adoption of more open standard of the IBM PC. WINDOWS, a combination of APPLE's graphical user interface with MICROSOFT's ubiquitous MS-DOS, won the world. By mid 1990s, APPLE was at the edge of bankruptcy. The result was a multi-national complex constellation of thousands of companies that The ECONOMIST[1] roughly lumped into three categories. Designing (APPLE, INTEL, HUAWEI, QUALCOMM); Manufacturing (Intel, Samsung, Mıcron, Tsmc) Packaging/assembly (Amcor, Jcet, Ase, Kıng Yuan). Designing is supplied by Arm, Xılınx, synopsys, Zuken. Manufacturing, and packaging/assembly is supplied by aır lıquıde, applıed materıals, asml, kmg chemıcals, lam reaserch, Naura, Sumco, Tokyo Electron, Hıtachı Hıgh-tecnologıes. A typical itinerary of raw silicon to completed microchip is a fair illustration of the elaborate supply chains that emerged. Microchip's initial travel may start in the Appalachian Mountains in north America, where deposits of silicon dioxide are of the highest quality. The sand may arrive in Japan to be turned into pure ingots of silicon. The ingots of silicon are then sliced into standardized wafers, 300mm across, and sent to a "fab", a chip factory, in Taiwan or South Korea for high-tech and to China for low-tech. It is in this stage that the slices will be imprinted with a particular pattern using photolithography equipment made in Holland by ASML.

ASML is not the only maker of photolithographic machines, which use light to etch integrated circuits into silicon wafers. It competes with CANON and NIKON of Japan. By 2019, the Dutch firm's market share has nearly doubled, to 62%, since 2006. ASML has harnessed "extreme ultra-violet" (EUV) light with wavelengths of just 13.5 nanometers. Shorter wavelengths allow the etching of smaller components, vital for chip makers striving to keep pace with MOORE'S LAW, which posits that the number of components that can be squeezed into a given area of silicon doubles roughly every two years. The world's three leading chipmakers, Intel, Samsung, and Taıwan Semıconductor Manufacturıng Company (TSMC) have become as reliant on ASML as the rest of the technology industry is on theirs.

ASML's revenues reflect this. $13.2billion in 2019 that grew by 8%. With neither Cannon nor Nıkon pursuing EUV technology. ASML's market cap grew tenfold since 2010, at $130billion, it is worth more than Sıemens or Volkswagen. The firm started as a joint venture with PHILIPS and ASM Internatıonal. In 1995, it listed its shares in New York and Amsterdam and shortly afterwards, the firm bet that EUV lithography would be the future of chip-making. Big chipmakers planned to use its machines by around 2007.

ASML has around 5000 suppliers. ASML is so vital to Intel, Samsung and TSMC have stakes in the firm. EUV lithography is on the wassenaar lıst of "dual use" technologies that have military as well as civilian applications. China is keen to foster advanced chip-making firms of its own, an ambition that President Trump is trying to thwart. In 2018, ASML received an order for an EUV machine from a Chinese customer widely thought to be the semıconductor manufacturıng ınternatıonal corporatıon, a Chinese big chip-maker. Under American pressure, the Dutch government has yet to grant ASML an export license. ASML announced its compliance with US COMMERCE DEPARTMENT's decision that blacklisted HUAWEI and its 70 affiliates in 2019, and notified HUAWEI of its decision. The particular pattern will be determined by the overall design of the chip. This design might come from ARM, a British company owned by SOFTBANK, a Japanese ASSET MANAGER. The design can be tweaked for specific applications by one of the company's many licensees.

In its next phase, it must be assembled into a package, in which the etched silicon is placed inside the ceramic or plastic containers that are dotted across any circuit board. Then testing follows. Packaging might take place in China, Vietnam or the Philippines. The integration into a circuit board could happen somewhere else again. The final result will be one of the many components that arrive at factories from Mexico to Germany to China, for assembly into a final product: an industrial robot, a smart vacuum cleaner or a tablet. China's domestic microchip industry started at the lower-value end of this process, semıconductor manufacturıng ınternatıonal corp, China's largest maker of semiconductors. Fueled by a fast growing domestic market, China established natıonal ıntegrated cırcuıt ındustry ınvestment fund help to turn promote design and higher-value manufacturing. The 2011 earthquake and tsunami in Japan besides revealing how globally integrated the manufacturing had become, starkly revealed that Japanese firms have been producing the bulk of chemicals and other materials to make microchips. Japanese firms had substantial control over copper foils for printed circuit boards, silicon wafers to make chips, and resin to package them.

For many components Japan was the home of biggest, sometimes the only, supplier. Microprocessors are chips that do most of the grunt work in computers. They are built around INSTRUCTION-SET ARCHITECTURES, (ISAS), owned either by INTEL or ARM. INTEL's ISAS power desktop computers, servers and laptops. ARM's power phones, watches and other mobile devices. Though there are others, together ARM and INTEL dominate the market. An INSTRUCTION-SET ARCHITECTURE is a standardized description of how a chip works at the most basic level, and instructions for writing software to run on it. Computer scientists at the University of California, Berkeley, wrote RISC-V for use for publishable research because commercial producers of ISAS were reluctant to make theirs available. The ISAS are proprietary, RISC-V is available to anyone, anywhere, and is free. RISC-V was introduced in 2014 at the HOT CHIPS MICROPROCESSOR CONFERENCE in California. It is now governed by a non-profit foundation. It recently moved to Switzerland out of American jurisdiction. The reason for shifting to RISC-V is the nature of open-source itself. Since the instruction set is already published online, American export controls do not apply to it. This has made it particularly popular with Chinese IT firms. ALIBABA announced its first RISC-V chip in July, 2019. HUAMI is mass producing smart watches containing processors based on RISC-V.

The most famous "open" governance system is LINUX, an operating system created and maintained through cooperative efforts to which all are, in principle, free to contribute and from which all are welcome to benefit. Others are "closed", as is the convention among many corporate-software makers, such as ORACLE. Some are run like absolute monarchies, such as APPLE under Steve Jobs, who was the final arbiter over the smallest details in his tech empire. America is a platform like MICROSOFT's WINDOWS and ANDROID, GOOGLE's mobile operating system. These mix aspects of open and closed systems, allowing others to develop applications for their platforms, but also closely control it. America combines monopolies and a state with competition. China is more like APPLE and ORACLE, which combine being closed with internal competition. The European Union is best compared to an open-source project like LINUX, which needs complex rules to work. India, Japan, Britain, Taiwan, and South Korea all run differently and have technology bases to match. The 21st century INTERNET would evolve to be a SPLINTERNET was, perhaps, inevitable. It is not just that nations act in their own interest; they also have different preferences and values, for instance regarding privacy. High digital borders behind which data get stuck, however, are not in the best interests of most countries – though they may be in the interest of some governments. Russia wants to create a "sovereign internet" that can be cut from the rest of the online world at the flip of a switch while retaining the capability to participate around in more open systems. Economies interested in using flows of data to improve their citizens' lot, though, will see few advantages. In a SPTINTERNET world choices will be limited, costs higher and innovation slower. And all the while China, with the biggest silo and thus greatest access to data, loses least.

President Trump's weaponızatıon of ınterdependence, his threats to cut off foreign financial institutions from SWIFT banking network and the dollar clearing system for doing business with countries or entities he does not like highlighted China's vulnerabilities. One of the gravest is China's dominant role in electronics assembly. China is home to half of the world's capacity. In May 2019 commerce department blacklisted HUAWEI and its 70 affiliates, barring American firms from selling certain technologies without government approval to them. On May 15, 2020 Trump administration expended its restrictions from chips to the tools used to make them. Most of them come from applıed materıals, based in California builds kit used to etch patterns into silicon that has 90% of its assets in US, LAM RESEARCH, a maker of equipment used by TSMC and others to process silicon wafers has 88% of its assets in US, TERADYNE has 69% in US. ASML has almost all of its assets in Netherlands, and Tokyo electron and Hıtachı hıgh-technologıes in Japan.

This shed light on another global network: microchip industry. The industry's geographic scope had already become broader, and less American over time. A crude yardstick for this is to track where the firms' assets are geographically located. Only 20% of the plants of top dozen global semiconductor firms are in America. When Asian firms located their factories at home, American firms have diversified geographically. Intel, for example, in 2019 had 35% of its physical assets, a rough proxy for manufacturing capacity, abroad. Some $8billion was in Israel, $4billion in Ireland, and $5billion in China its biggest market. $20billion of Intel's $72billion revenues in 2019 was from China. Another example is Analog Devıces, an American firm which makes radio-frequency chips for Huawei for the assembly of telecoms base stations. Half of analog devıces's assets are in the Philippines, Ireland, Singapore and Malaysia.

Around half of the modem chips to manage wireless connections of the world's baseband processors are made by Qualcomm. Virtually all "server-class" chips used in world's data centers are made by Intel. Chips based on designs licensed from ARM are ubiquitous in almost every advanced smart-phone. For their part, Qualcomm, ARM and other chip designers depend on foundries to turn silicon into microprocessors. Intel, Samsung, and TSMC, in turn, rely on a bevy of specialized equipment suppliers to equip their factories. The emerged technically interdependent complexity of chip-making is multinational as its financial structure. Taiwan had no comparative advantage in semiconductor manufacturing in the 1980s. Yet the Taiwanese government made a political decision to create state-sponsored Taıwan semıconductor manufacturıng company. The Taiwanese government nurtured TSMC with tariffs and subsidies in its early days when it was most vulnerable to foreign competition. TSMC, now, is a publicly traded company, a status the company could not have achieved without Taiwanese government's help. Those who shamelessly teach Ricardo's comparative advantage as science in their international economics classes should note that the Taiwanese created their comparative advantage, as Samsung did in South Korea. The mainframe did not cause the invention of the personal computer, but the wide market the mainframe created enabled the rather easy penetration of the personal computer into an expanding market. In addition, the spreadsheet is often described in histories of technologies as the killer app that caused an explosion of the personal computer market. The spreadsheet is the complement of the personal computer. Each helped the other gain market share. The personal computer did not cause but enabled the invention of word processing, and software companies like Mıcrosoft emerged, which was originally founded to make the operating system for IBM personal computers. The invention of word processing and abundant files invited the possibility of file sharing, and the modem was invented. The existence of file sharing did not cause, but invited, the invention of the World Wıde Web. The existence of the WEB did not cause, but enabled, selling on the Web, and eBay and Amazon emerged. And eBay and Amazon put content on the Web as did myriad other users, enabling the invention of web browsers; and also companies like Google emerged. Thence has followed social media and Facebook. Almost all of these successive innovations are the complements of the preceding ones. The existing goods and services at each state are the context in which the next good and/or service emerges. Word processing is a complement of the PC, the modem a complement of word processing, the web is a vast interconnected modem and

is a complement and much more to file file-sharing.

The opportunity to share files invited the invention of the modem. Accordingly, Schumpeter's depiction of capitalism's cycles of creation and destruction need to be modified to reflect goods and services as contexts that do not cause, but enable, the invention and introduction of the next good or service. Enablement is neither a Schumpeterian nor a neoclassical equilibrium theory concept. With a long decline in manufacturing profitability partly due to the income distribution system of managerıal capıtalısm that the victors of WWII put in place in the rich economies, and partly due to the global overcapacity developed as the emerging economies of the world tried to catch up with the rich west, Anglo-American neoliberals have turned to globalize finance and data as one way to maintain economic growth as they measured economic growth with their biased GDP accounting rules that do not account for the destroyed natural and environmental resources in the process, and vitality in the face of sluggish manufacturing sector of the rich west enabled asset manager capıtalısm. All economic doctrines, but the anarchists, presuppose the existence of some kind of state, even minimal 'night-watchman-state'. What emerged from the globalization efforts of asset manager capıtalısm in the last two decades of the 20th century were the attempts to integrate markets, particularly financial markets, on a global scale without a state. And, what emerged has rendered life in the globalized markets more insecure, more criminal and uncertain. It was the globally stateless, deregulated global financial structure that collapsed in 2008 ironically to be saved and put in place by all governments that the global financial system had down-sized and stripped their regulatory power. Capital since has become mobile with investors roaming the globe in search of a more benign tax or regulatory environment. Financial assets are traded and and settled in digital clouds with no land in sight. Yet, there is no single global legal system to support global financial system, nor is there a global state to back it with its coercive powers, perhaps with one exception: SWIFT after PATRIOT ACT that followed 9/11. Since capital is coded in law, existence of global finance in the absence of global state and a global legal system needs an explanation.

Global financial system can be sustained, at least in theory, by a single domestic legal system, provided that other states recognize and enforce its legal code. Global financial system as it exists in 2020 comes very close to this theoretical possibility. It is built around two domestic legal systems: the law of England and those of New York State, complemented by a few international treaties, and an extensive network of bilateral trade and investment regimes, which themselves are centered around a handful of advanced economies.

Exporting law has a long history. Imperialism was not only about military conquest, but also about spreading the legal the legal systems of the European states to the colonies they created in Africa, Asia, and the Americas. The legal systems of most countries around the globe belong to one of the three leading legal groupings: the English common law, the French civil law, and the German civil law. Even countries that escaped colonization were pressured to adopt Western law. Japan is a prominent example. The diffusion of European legal systems throughout the globe has greatly reduced legal variance, but it has not produced uniformity. In England and New York State the legal code for global capital is forged in the private law offices, not public legislatures and no longer even in courts that have been sidelined as potentially disruptive for private coding strategies. The global code of capital is about who should determine the contents and meaning of property rights: states or private parties; the democratic public or the captains of industry and finance. The dispute is over who gets to determine what property right is: The Sovereign or private parties. Building the legal infrastructure for global business has taken for the most part, two forms: the harmonization of laws in different states, and the recognition and enforcement of foreign laws. The latter has been much more successful in protecting capital globally, but it did require that countries adapted their own conflict-of-law rules to ensure that private choice and autonomy would prevail over public concerns. The trend to outsource law to private agents by offering the option to choose domestic or foreign law as they please had been the preferred response to the difficulty of harmonizing the law by political means. The European Union is the poster child for countries coming together to forge common rules for common market. Negotiating a common set of rules proved to be slow and cumbersome even for countries with common history going back to Roman Law. The alternative to harmonization of laws through the political process is legal and regulatory competition among states combined with private autonomy for the law's end-users, who get to pick and choose what is best for them. Countries only need to put in place conflict-of-law rules that endorse the choices that private parties make to achieve the alternative option. Financial assets are coded in the modules of the code of capital over which lawyers have much sway subject only to challenge in a court of law. Most financial assets that are traded globally are coded in two legal systems; the laws of England or New York State. Finance may be global, but the legal code that carries the core features of financial assets is parochial. The big stumbling block to seamless global markets based on domestic law is bankruptcy law. The derivatives traders lobbied the legislatures in more than 50 countries to amend their bankruptcy codes and create a 'safe harbor' for derivatives and repos exempting these financial assets from rules that are binding, making domestic laws compatible with private contracts. INTERNATIONAL SWAPS AND DERIVATIVES ASSOCIATION, organized as a non-profit corporation in the State of New York, London, and Tokyo was very most influential in coding law for global finance. ISDA was formed to create the foundation for scalable markets in products that were standardized, yet offering enough room for tailoring them to meet the needs of specific clients. ISDA's contracts are primarily used for derivatives that are traded over the counter (OTC). These markets suffered by the financial crisis, but have rebounded to pre-crisis level.

ISDA's MASTER AGREEMENT is a piece of private legislation that specifies the rights and obligations of counterparts wishing to engage in derivatives transactions with one another. MASTER AGREEMENT is not intended as a substitute for domestic law but uses it as a gap filler. It prompts the parties of the MASTER AGREEMENT to choose a default law and to elect courts from that legal system for resolving any disputes: English law or the law of New York State. A new arbitral tribunal has been established, the PANEL OF RECOGNIZED INTERNATIONAL MARKET EXPERTS IN FINANCE (PRIME) in The Hague. ISDA's master agreement is attentive to questions of default and terminations. The counterparties to derivatives are in the business of minting private money, assets that are cloaked in law to give them the appearance of state money. Invariably they will find themselves from time to time unable to convert their private money into state money at the speed and for the price they desire. Typically, when their own creditors are knocking on their door. The MASTER AGREEMENT with contractual provisions sought to create a special default regime for derivatives traders that allows them to reposition their bets even as one of their counterparties finds itself in bankruptcy.

Bankruptcy is mandatory law, therefore private actors cannot just contract around it. And because of bankruptcy's mandatory nature, the debtor's home laws govern bankruptcy. ISDA lobbied more than 50 legislatures to change their bankruptcy laws to accommodate ISDA's private legislation which specifies the rights and obligations of counterparties wishing to engage in derivatives transactions with one another. Like other financial markets, derivatives markets also operate in the shadow of the state and its financial prowess. The fact that sovereign states had to co-opt a private business association, namely ISDA, to achieve their regulatory goals, indicates the extent to which states have lost control over the governance of global finance.

ISDA created facts on the ground by developing the master agreement, a contractual device that involved cross-border deals. ISDA lobbied legislatures to adapt their laws to make them consistent with ISDA's contractual instrument, thus turning the principle that contracts have to be consistent with the law on its head. the master agreement is the foundation for global derivatives trades, and players in these markets have little choice but to adhere to ISDA's rule book. Powerful holders of global capital with the help of their lawyers have not only found ways to utilize the law for their own interests. They have turned the legislatures, regulators, even courts in most countries, into agents that serve their interests, rather than those of the citizens to whom they are formally accountable. Contrary to standard Marxist accounts, they have done this without occupying directly positions of state power. Instead, they have used the powers of the state indirectly. They have concocted their own private law in their lawyer's offices, stitched together from different domestic legal systems with international or bilateral treaty law thrown in the mix. Private lawyers have pieced together different portions of legal rules that were adopted in different areas, and their combined effect became apparent only after all the pieces had been put into place. The interpretation of law is always an act of lawmaking. As the 21st century developments in digital technologies enabled firms to generate and amass data, data have become increasingly central to firms to recast their relations with their employees, their customers, and competitors. A new business model has emerged, the platform, capable of extracting and controlling unimagined amounts of data, and with this development, there emerged gigantic monopolistic data owning centers. Primarily, platforms are digital infrastructures that enable two or more groups to interact. Instead of having to build a marketplace from the ground up, a platform provides the basic infrastructure to mediate between different groups. This is platforms' key advantage over traditional business models when it comes to data. A platform positions itself between users, as the medium upon which their activities take place, hence giving the platform the privileged access to record the users' activities and store and own them. Moreover, digital platforms produce and depend on 'network effects', more users begetting more users which develop their innate inertia to monopolize.

The ability to rapidly scale many platform businesses by relying on pre-existing infrastructure and low marginal costs with few limits to growth further enables monopolization. Platform owners set the rules of service and development, as they set marketplace interactions. In their intermediary positions, platforms gain not only access to more data but also control and governance over the rules of the game. Far from simply being the owners of data, these data giants are emerging to become the owners of the emerging infrastructures of societies in the future. The monopolistic DNA of these platforms must be taken into account in any analysis of their effect on the broader economy. "Capitalism without competition is not capitalism." warn Jonathan Tepper with Denise Hearn (Tepper and Hearn, 2019). But not according to vocal defender of the monopoly form, Peter Thiel, a Silicon Valley entrepreneur and the author of zero to one: notes on startups, or how to build the future. Peter Theil's view is that commercial success is built in 4 strategies: building a proprietary technology; exploiting network effects benefiting from economies of scale; and branding. The management literature calls these "strategic resources", and says they've three characteristics. They are valuable rare and hard to imitate.

But, one strategy of successful business that Theil seems to omit is building a good organization. Labelling the competitive-economy a "relic of history" and a "trap", as robber barons did at the turn of 20th century, he proclaims that "only one thing can allow a business to transcend that daily brute struggle for survival: monopoly profits." FACEBOOK to "bringing the world together" requires a global monopoly. Meanwhile, GOOGLE wants to organize the world's information and AMAZON wants nothing more than all the information to serve the world's consumers. Neoclassicals' economic model to explain and predict the platform world in the making is not helpful, but actually distorting.

Since platforms are grounded on the extraction of data and generation of network effects, the following broad strategies seem to have emerged from the competitive dynamics of these large platforms. Expansion of DATA EXTRACTION STRATEGIES by driving cross-subsidization of services to draw users into their network. GATEKEEPER STRATEGIES by positioning as a gatekeeper to occupy key positions within the ecosystem around a core business neither by horizontal nor vertical nor conglomerate mergers. They are more like rhizoidal connections driven by permanent effort to place themselves in key platform positions. CONVERGENCE OF MARKETS STRATEGIES. The convergence thesis is the tendency for different platform companies to become increasingly similar as they encroach upon the same market and data areas. SILOED PLATFORM STRATEGIES by enclosing ecosystems and funneling of data extraction into siloed platforms. Their strategic choices are being installed in the 21st century ecosystems.

Ariel Ezrachi and Maurice E. Stucke in Vırtual competıtıon: The promıse and perıls of the algorıthm-drıven economy (Harvard College, 2016) warns: "Competition as we know it- the invisible hand that distributes the necessities of life- is being displaced in many industries with a digitalized hand. The latter, rather than being a natural force, is man-made, and as such is subject to manipulation. The digitalized hand gives rise to newly possible anticompetitive behaviors, for which the competition authorities are ill-equipped." (Ezrachi and Stucke, 2016). "The upsurge of algorithms, Bıg Data and super-platforms will hasten the end of competition as we know it-a decline of the market system to which we have become accustomed. …. The innovations from machine learning and Bıg Data can be transformative lowering entry barriers, creating new channels for expansion and entry, and ultimately stimulating competition if companies' incentives are aligned with consumers' interests, and on their actions' collective impact on markets." (Ezrachi and Stucke, 2016) But, data-driven online markets do not have the built-in incentives to correct the market realities that emerged as declining upward mobility, diminishing rates of small-company creation, increasing market concentration and power, and widening wealth inequality. "Despite having one of the older antitrust laws, the United States is no longer viewed as the intellectual leader of antitrust." (Ezrachi and Stucke, 2016.) Continuous production may still be going strong, in fact stronger than ever thanks to industrial robots, but it has lost its excitement of the early and middle twentieth century particularly in the United States, with the emergence of Asset Manager Capitalism. The platform company, which uses software to bring together buyers and sellers of goods and services, represents a new kind of efficiency, based less on the organization of machines and human labor than on gathering, analysis, and exchange of data. This is disruptive business process innovation. It reduces transaction costs by matching buyers and sellers with automated software. The platform era that began in the late 1990s with Amazon.com entered a new phase in the 21st century with the rise of search engines, smartphones, social media, networked web-based software, and a revival of artificial intelligence. In the 1990s greenspan's monetary policies fueled Wall Street's romance with platform based efficiency and diverted capital and talent from riskier but ultimately more broadly beneficial market creating innovation to dot.com IPOs.

The dramatic run-up in dot.com stocks transferred trillions of dollars from those that bought to those that sold dot.com stocks. Retirement funds of the rich countries that fell under Greenspan's spell were major buyers, therefore major losers. The money managers of the retirement funds, however, kept their bonuses. RASPUTIN would have envied. The continuous process innovations did not just reduce friction. In eliminating some jobs, they created many others, often more skilled and higher paid. Some believe that this phase of technology was a one-time event that will not be repeated by 21st century platform companies. Such a view is not tweeted by President Trump who has promised to bring the off-shored jobs back to his nostalgic supporters. Now, we are in the midst of the third saltation that McAfee and Brynjolfsson call it the second machine age in the second machıne age:work, progress, and prosperıty ın a tıme of brıllıant technologıes (Brynjolfsson and McAfee, 2014), and in MACHINE, PLATFORM, CROWD: HARNESSING OUR DIGITAL FUTURE (McAfee and Brynjolfsson, 2017)[1], they offer explanations of these technologies. Nick Bostrom calls the third saltation superintelligence in Superıntellıgence: Paths, Dangers, Strategıes (Bostrom 2014)[1], Max Tegmark's moniker is life:3.0 in LIFE 3.0: beıng human ın the age of artıfıcıal ıntellıgence (Tegmark, 2017)[1]. GOOGLE's in house technology guru Ray Kurzweil declares the sıngularıty ıs near: when humans transcend bıology (Kurzweil, 2005)[1], and also in how to create a mınd: the secrets of human thought revealed (Kurzweil, 2013). These writings either imply or explicitly posit the arrival of singularity when the contributions of artificial superintelligence will rise to such a level that they will be transformed into an unprecedented runaway process. This implies not only artificial intelligence surpassing any human capabilities imaginable but also coming ever closer to an instantaneous rate of physical change. Kurzweil predicted that as computer power and artificial intelligence expands to the point that it has the capacity to improve itself, computers effectively designing and creating more computers that is, the nature of humanity will irrevocably transcend our biological limitations. Kurzweil's prediction for artificial intelligence taking over is for 2045. In the deep learnıng revolutıon (Sejnowski, 2018), Terrence J. Sejnowski gives us a concise history of learning algorithms that extract information from raw data; how information can be used to create knowledge; how knowledge underlies understanding; and how understanding leads to wisdom.

In 1999, Ray Kurzweil launched a hedge fund based on complex mathematical strategies called FatKat, short for fınancıal acceleratıng transactıons from kurzweil's adaptıve technologıes. FatKat deployed algorithms to ceaselessly comb through the market for new opportunities. The algorithms competed against one another in a Darwinian death match. The algorithms that made money survived. The weak died off. Many financial operations mandate making choices based on pre-defined rules. In performing these predefined rules as fast as possible machines were deployed. This is where the bulk of automation has taken place so far, transforming financial markets into ultra-fast hyper-connected networks for exchanging information. High-frequency trading is a prime example. Algorithms developed to model fluctuations in financial markets gained control of those markets, leaving human traders behind.

"The essential tool of econometrics is multivariate linear regression, an 18th century technology that was already mastered by GAUSS before 1794. Standard econometric models do not learn. It is hard to believe that something as complex as 21st century finance could be grasped by something as simple as inverting a covariance matrix. The researcher will fail to recognize the complexity of the data, and the theories will be awfully simplistic, useless. I have no doubt in my mind, econometrics is a primary reason economics and finance have not experienced meaningful progress over the past decades." writes Marcos Lopez De Prado in advances ın fınancıal machıne learnıng[1] (Wiley, 2018). Discretionary portfolio managers, PMs, make investment decisions by consuming raw news and analyses, but mostly rely on their judgement or intuition rationalizing their decisions by some story. There is some story for every decision. Discretionary PMs are at a disadvantage when betting against a machine learning, ML, algorithm, but better results are possible by combining PMs with MLs in "quantamental" way.

"What the Americans termed "artificial intelligence" the British termed "mechanical intelligence", a designation that Alan Turing considered more precise. We began by observing intelligent behavior (such as language. Vision, goal seeking, and pattern-recognition) in organisms, and struggled to reproduce this behavior by encoding it into logically deterministic machines. If the statistical toolbox used to model these observations is linear regression, We knew from the beginning that this logical, intelligent behavior evident in organisms was the result of fundamentally statistical, probabilistic processes, but we ignored that (or left the details to the biologists), while building "models" of intelligence with mixed success. Through large-scale, probabilistic

information processing, real progress has been made on some of the problems, such as speech recognition, language translation, protein folding, and stock market prediction – even if for the next millisecond, now enough time to complete a trade. …. The behavior of a search engine, when not actively conducting a search, resembles the activity of a dreaming brain. Associations made while "awake" are retracted and reinforced, while memories gathered while "awake" are replicated and moved around William C. Dement, who helped make the original discovery of what became known as REM (rapid eye movement) sleep, did so while investigating newborn infants, who spend much of their time in dreaming sleep. Dement hypothesized that dreaming was an essential step in the initialization of the brain. Eventually, if all goes well, awareness of reality evolves from the internal dream – a state we periodically return to during sleep. "The prime role of 'dreaming sleep' in early life may be in the development of the central nervous system", Dement announced in SCIENCE in 1996." (Dyson, 2012).

"Only one-third of a search engine is devoted to fulfilling search requests. The other two-thirds are divided between crawling (sending a host of single-minded digital organisms out to gather information) and indexing (building data structures from the results). The load shifts freely between the archipelagoes of server farms. Twenty-four hours a day, 365 days a year, algorithms with names such as BigTable, MapReduce, and Percolator are systemically converting the numerical address matrix into a content-addressable memory, effecting a transformation that constitutes the largest computation ever undertaken on planet Earth. We see only the surface of a search engine – by entering a search-string and retrieving a list of addresses, with contents, that contain a match. The aggregate of all our random searches for meaningful strings of bits is a continuously upgraded mapping content, meaning, and address space: a Monte Carlo process for indexing the matrix that underlies the World Wide Web. …. The Monte Carlo method was invoked as a means of using statistical probabilistic tools to identify approximate solution to physical problems resistant to analytical approach. Since the underlying physical phenomena actually are probabilistic and statistical, the Monte Carlo approximation is often closer to reality than the analytical solutions that Monte Carlo was originally called upon to approximate." (Dyson, 2012). The information theory of Kurt Godel, John Von Neumann, Alan Turing, and Claude Shannon tells us that human creations and communications are transmissions across a channel, whether that channel is a wire or the www measure the outcome as its "news" or surprise, defined as entropy and consummated as knowledge. Entropy is higher or lower depending on the freedom of choice of the sender. The larger the available alphabet of symbols – that is, the larger the set of possible messages – the greater the composer's choice and the higher the entropy and information of the message. Information is not order but disorder, not the predictable regularity that contains no news, but the unexpected modulation, the surprising bits. "Claude Shannon used "entropy" to designate information content in a communication channel. More entropy in Shannon's theory signifies more information. In Shannon's terms, entropy is a measure of unexpected bits, the only part of a message that actually bears information. Otherwise the signal is telling you what you already know. To send unexpected bits – a high entropy message – you need a low entropy carries: a predictable vessel for your meaning. You need a blank sheet of paper that does not alter or obscure the message inscribed on it. … In order for the message to be high entropy (full of information), the carrier must be low entropy (empty of information). In the ideal system, the complexity is the message rather than in the medium. … Another word for a low entropy carrier is a dumb network. The dumber the network the more intelligence it can carry." stated George Gilder in Telecosm: How Infınıte Brandwıdth Wıll Revolutıonıze Our World (Gilder, 2000). Low entropy corresponds to low uncertainty and little information being revealed. When an outcome occurs in a low-entropy system, such as sun rising in the east, we experience little surprise. In high-entropy systems, such as the drawing of numbers in a lottery, the outcomes are uncertain and when realized, they reveal information. We are surprised. Entropy measures the uncertainty associated with a probability distribution over outcomes. It therefore also measures surprise. Entropy differs from variance, which measures the dispersion, but the two differ. Distributions with high uncertainty have nontrivial probabilities over many outcomes. Those outcomes need not have numerical values. Distributions with high dispersion take on extreme numerical values. Using entropy, we can compare disparate phenomena, and distinguish between 4 classes of outcomes: equilibrium, periodicity, complexity, and randomness. Equilibrium outcomes have no uncertainty and therefore, have an entropy equal to zero. Cyclic, or periodic processes have low entropy that does not change with time, and perfectly random processes have maximal entropy. Complexity has intermediate entropy. It lies between ordered and random. While entropy provides us a definitive answer in the two extreme cases, equilibrium and random, it does not for cyclic and complex outcomes.

"Information theory provides a measure of the amount of information conveyed by a message. This measure is based on the extent of surprise, or unexpectedness of the message to the receiver." (Lev and Gu, 2016) write Baruch Lev and Feng Gu in the end of accountıng and the path forward for ınvestors and managers (Lev and Gu, 2016), and add "over the past 60 years, the role of corporate earnings, book values, and other key financial indicators in setting share prices diminished rapidly, and in terms of information timeliness or relevance to investors' decisions, financial report information (not just earnings and book values) is increasingly preempted by more prompt and relevant information sources." (Lev and Gu, 2016) "It is not only fraudulent information (ENRON's; WORLDCOM's) that impedes investment and growth; it's mainly the poor quality of "honest" financial reports, legitimately disclosed under the current, universally used accounting system, that seriously harms the capital allocation system and economic growth." (Lev and Gu, 2016). But, human creativity and surprise depend upon a matrix of regularities, from the laws of physics to the stability of money and Isaac Newton was the godfather of both. Since these creations and communications can be business plans or experiments, information theory provides the foundation for an economics driven not by equilibrium or order but by falsifiable entrepreneurial surprises. Information theory has impelled the global ascendancy of information technology. From worldwide webs of glass and light to a boom in biotech based on treating life itself as chiefly an information system, a new system of the world is transforming our lives. And, the static neoclassical economic theory is not at all helpful in understanding this transformation, actually a hindrance. Claude Shannon's breakthrough was mapping electrical circuits to BOOLE's symbolic logic and then explaining how BOOLEAN logic could be used to create a working circuit for adding 1s and 0s. Shannon had figured out that computers had two layers: physical (container) and logical (the code). While Shannon was working to fuse BOOLEAN logic onto physical circuits, Turing was testing LEIBNIZ's language translator that could represent all mathematical and scientific knowledge. Alan Turing combined mathematical insight with mathematical theory to give us a principled way of finding computationally complete sets of instructions – sets of instructions that, subject to constraints of memory size, can be sequenced to define any conceivable algorithm. In a similar way, the vast and bewildering array of chemical reactions observed by alchemists became organized and, in principle, predictable once we had Mendeleev's periodic table of the elements and their "valences". The system got synthesized by combining a simple, fixed set of building blocks: rules, axioms, instructions, or elements. Much the same can be said for the five axioms of Euclidean geometry. After two millennia of study, geometers are still discovering new theorems. More prevalent to our current concerns, the "machine code" of a contemporary computer chip usually involves 32 or 64 basic instructions, and a program is simply a sequence of these instructions. Turing aimed to prove what was called the Entscheıdungsproblem, or "decision problem", that is: no algorithm can exist that determines whether an arbitrary mathematical statement is true or false. The answer would be negative. Alan Turing was able to prove that no algorithm exists, but as a byproduct, he formulated a mathematical model for an all-purpose computing machine. Alan Turing figured out that a program and data it used could be stored inside a computer. Turing's universal machine intertwined the machine, the program and the data. From a mechanical standpoint, the logic that operated circuits and switches also encoded into the program and data. The container, the program, and data were part of a singular entity. Not unlike humans. We too are containers (our bodies), programs (autonomous cellular functions), and data (our DNA combined with indirect and direct sensory information). The mind, accordingly, consists of a collection of content-specific information-processing modules adapted to past environments. This was the high point of what is called the cognıtıve revolutıon. Though it now owes much to the tragic genius of Alan Turing, with his extraordinary mathematical proof that reasoning could take mechanical form, that it was a form of computation, the Cognıtıve Revolutıon actually began in 1950s with Noam Chomsky. Contrary to Alan Turing's empirical view of the brain as a notebook with lots of blank sheets that sensory experience progressively fills out, Chomsky argued that the universal features of human language, invariant throughout the world, plus the impossibility of a child deducing the rules of language as quickly as it does merely from the scanty examples available to it, must imply that there was something innate about language. Much later Steven Pinker in the language ınstınct: how the mınd creates language (Pinker, 1995) and in how the mınd works (Pinker, 1997),

dissected "language instinct", the notion that what the mind was equipped with was not innate data but innate ways of processing data.

In becomıng human: a theory of ontogeny, Michael Tomassello disagrees: "All this language learning rests on biologically evolved cognitive and social capacities and is carried out with biologically evolved social learning skills. However, there is much controversy over the nature of humans' biological predispositions for linguistic communication. At the extreme, Chomsky and his followers have maintained that children are born with a kind of innate template that guides language acquisition, a so-called universal grammar, modelled as a quasi-mathematical system. The evolution of its particular structure was a kind of accident, as it has nothing to do with human cognition or communication. The problem is that this proposal is contradicted by cross-linguistic investigations, which do not find any of the kinds of universal structures that universal grammar supposedly makes available to all the world's languages. It is also contradicted by empirical investigations of language acquisition, which have not found the kinds of abstract linguistic representations that universal grammar is supposed to make available to children. Moreover, there are fundamental logical problems of how a child is born with a universal grammar, abstract enough to fit any of the world's 6,000 languages, could actually link its structures to the particular conventions she experiences. At the other extreme, at least since the demise of behaviorism, there have been no serious proposals that children acquire language by the same kind of simple and straightforward learning processes as other animals. Human beings are clearly biologically prepared for special forms of communication, including linguistic communication based on social conventions. The key is that this preparation is not about specific linguistic structures, as the universal grammar hypothesis claims, rather, it is about more general and basic psychological processes that we recruited for this specific task. For this account to work we need a theory of word learning of rich variety that is not based on association learning as employed by animals, but rather is based again in joint attention, communicative intentions, and conventional symbols. And finally, for this account to work we need a theory of acquisition of grammar that is not based in contentless abstract rules, but rather is based in a schema-based notion of linguistic constructions acquired with the same basic cognitive and social processes as all other aspects of conventional linguistic communication. "(The President and Fellows of Harvard College, 2019).

Michael Tomasello in a natural hıstory of human thınkıng adds further, "In general, humans are able to coordinate with others in a way that other primates seemingly are not, to form a 'we' that acts as a kind of plural agent to create everything from a collaborative hunting party to a cultural institution. Important aspects of human thinking emanate not from culture and language per se but rather from some deeper and more primitive forms of uniquely human social engagement." (President and Fellows of Harvard College, 2014. And, Michael Tomasello with Carol Dweck, Joan Silk, Brian Skyrms, and Elizabeth Spelke in WHY WE COOPERATE add "There is evidence for at least five cognitive systems in young infants: what I call systems of core knowledge. There are systems for representing and reasoning about (1) inanimate, material objects and their motions, (2) intentional agents, and their goal-directed actions, (3) places in the navigable environment and their geometric relations to one another, (4) sets of objects or events and their relationships of ordering and arithmetic, and (5) social partners who engage with the infant in reciprocal interactions. Each of these cognitive systems emerges early in infancy (in some cases, at birth) and remains present, and essentially unchanged, as children grow. Thus, the systems are universal across our species, despite the many differences in the practices and belief systems of people in different cultural groups. Most important, these core knowledge systems are relatively separate from one another and limited in their domains of application."(MIT, 2009).

Stanislas Dehaene in how we learn: why braıns learn better than any machıne for now (Stanislas Dehaene, 2020) argues that the basic circuitry is the same in all of us, as is the organization of our learning algorithm, the four pillars of learning - focused attention, active engagement, error feedback and the cycle of daily rehearsal and nightly consolidation – that lie at the foundation of the universal human learning algorithm present in all our brains, children and adults alike. He adds "by constantly attending to probabilities and uncertainties, it optimizes its ability to learn. During its evolution, our brain seems, to have acquired sophisticated algorithms that constantly keep track of the uncertainty associated with what it has learned – and such a systematic attention to probabilities is, in a precise mathematical sense, the optimal way to make the most of each piece of information." (Dehaene, 2020).

The progress of digital technology is generally associated with Gordon Moore of MOORE'S LAW which state that computer processing speeds grow exponentially, doubling every 18 months or so. The one about the growth in data transmission, associated with George Gilder, is called GILDER'S LAW which state that the data transmission rates would grow 3 times faster than computer power. Data transmission speeds did grow much faster than processing speeds for few years, but then slowed to about the same pace as Moore's law. The one about the growth of usefulness of digital networks, associated with Robert Metcalf, is called METCALF'S LAW which states that the value of a network grows faster than the number of people connected to it. It grows twice as fast. The outcome is sometimes called TIPPING-POINT ECONOMICS. When the size of a thing gets past its tipping-point, it can snowball into something very big, very fast. Thus, it also explains the winner-take-all outcomes seen with on line competition among networks. The one that explains the mind bogging pace of innovation, associated with Hal Varian, is called VARIAN'S LAW which state that digital components are free while digital products are highly valuable. Innovation explodes as people try to get rich by working through the nearly infinite combinations of components in search of valuable digital products.

These LAWS help to explain why the economy in cyberspace seems to act differently than the economy in real space. METCALF'S LAW helps to explain the tendency of virtual economy to act as a winner-take-all contest. The power of networks and the eruptive pace of raw computing and transmission power are not the only thing driving the inhumanly fast pace of digitech. There is something very different about innovation in the digital world compared to the industrial world. The nature of digital innovation is quite different. It is radically faster because the nature of the underlying components is different. It is DIGITAL COMBINATORIC INNOVATION that is what Hal Varian calls it. The components are open-source software, protocols, and APPLICATION PROGRAMMING INTERFACES (APIs), all free to copy.

3. Is dataism data-fetish?

DATAISM regards the universe to consist of data flows and the value of any phenomenon or entity to be determined by its contribution to data processing. DATAISM was born from the confluence of life sciences that came to see organisms, since the publication of Charles Darwin's ON THE ORIGIN OF SPECIES, as biological algorithms and Alan Turing's idea of TURING MACHINE. Computer scientists have learned to engineer increasingly sophisticated electronic algorithms. An algorithm is a methodical set of steps that can be used to make calculations, resolve problems and reach decisions. An algorithm is not a particular calculation, but the method followed when making the calculation.

DATAISM puts the two together pointing out that the same mathematical laws apply to both biochemical and electronic algorithms. DATAISM, eliminating the barrier between animals and machines, expects electronic algorithms to eventually decipher and outperform biochemical algorithms. According to DATAISM, Mozart's MAGIC FLUTE, stock market bubble, HIV virus are three patterns of data flow that can be analyzed using the same basic concepts and tools.

"Life relies on digitally coded instructions, translating between sequence and structure (from nucleotides to proteins), with ribosomes reading, duplicating, and interpreting the sequences on the tape. But any resemblance ends with the different method of addressing by which the instructions are carried out. In a digital computer, the instructions are in the form of COMMAND (ADDRESS) where the address is an exact (either absolute or relative) memory location, a process that translates informally into "DO THIS with what you find HERE and go THERE with the result". Everything depends not only on precise instructions, but also on HERE, THERE, and WHEN being exactly defined. In biology, the instructions say, DO THIS with the next copy of THAT which comes along." THAT is identified not by a numerical address defining a physical location, but by a molecular template that identifies a large complex molecule by some smaller identifiable part. This is the reason that organisms are composed of microscopic (or near-microscopic) cells, since only by keeping all the components in close physical proximity will a stochastic, template-based addressing scheme work fast enough. There is no central address authority and no central clock. Many things can happen at once. This ability to take general, organized advantage of local, haphazard processes is the ability that (so far) has distinguished information processing in living organisms from information processing by digital computers. Our understanding of life has deepened with our increasing knowledge of the workings of complex molecular machines. While our understanding of technology has diminished as machines approach the complexity of living things. As the digital universe

expanded, it collided with two existing stores of information: the information stored in genetic codes and the information stored in brains.

The information in our genes turned out to be more digital, more sequential, and more logical than expected and the information in our brains turned out to be less digital, less sequential, and less logical than expected. …. The brain is a statistical, probabilistic system, with logic and mathematics running as higher-level processes. The computer is a logical, mathematical system, upon which higher-level statistical, probabilistic systems, such as human language and intelligence, could possibly be built. …. In a digitally coded system, each digit has a precise meaning, and if even one digit is misplaced, the computation may produce a wrong answer or be brought to a halt. In a pulse-frequency-coded system, meaning is conveyed by the frequency at which pulses are transmitted between given locations – whether those locations are synapses within a brain or addresses on the WORLD WIDE WEB. Shifting the frequency shifts the meaning, but the communication, storage, and interpretation of information is probabilistic and statistical, independent of whether each bit is in exactly the right place at exactly the right time. Meaning resides in what connects where, and how frequently, as well as by being encoded in the signals conveyed. Codes – we now call them apps – are breaking free from the intolerance of the numerical address matrix and central clock cycle for error and ambiguity in specifying where and when. …. Pulse-frequency coding for the Internet is one way to describe the working architecture of a search engine, and PageRank for neurons is one way to describe the working architecture of the brain. These computational structures use digital components, but the analog computing being performed by the system as a whole exceeds the complexity of the digital code on which it runs." conveys George Dyson. (Dyson, 2012).

Much of the data created is raw and unstructured. Structured data is highly organized. It can be codified, placed in spreadsheets, sorted, and searched. Records of transactions, income statements, and historical temperatures are all examples of structured data. They can be analyzed with computing techniques. Unstructured data is the opposite. It has no predefined model or structure. The individual data points have no clear and well-defined relationship with each other, and so cannot be sorted in a spreadsheet or organized in by pivot table. The millions of random photos taken each day, the conversations recorded between police, countless emails sent between corporate servers are some examples of unstructured data. Traditional approaches to computing are only able to use unstructured data effectively if it has first been refined or processed by human beings into structured data, significantly increasing the cost of analyzing the data and decreasing the speed of reaction to it. The manual structuring of the data reduces its richness by placing it into a redefined framework rather than enabling unexpected patterns and insights to emerge.

Ai is about applying machines rather than humans to the process of interpreting unstructured data. It aims to accelerate the process and scale it to accommodate the enormous quantities of data involved, while also enabling the identification of new and emerging patterns that a human might not have been able to look for it. Ai is able to do this because unlike conventional approaches to computing which are static, Ai learns from experience using past and present data. The idea of learning is an essential component of what defines Ai which in successive iterations or loops of data applied to model train it to improve its performance. The supervised learning technique provides the model being trained with data that has been structured and labeled by humans and where a clear objective has been outlined. Unsupervised learning training data does not include labels or instructions, and sometimes does not even provide a goal, instead allowing the model to identify its own structure, patterns, and groupings within the data. A third method called reinforcement learning scores the performance of variations in a model against an objective to determine which model works best for a given data set.

At its most basic level, machine learning parses existing data, learns from it. And then makes a prediction based on that learning. It is, actually, a line of best fit in a simple regression model that might improve each time a new data point is added. When the line of best fit is recalculated with this new data, it could be said to have learned, in that it is now a more accurate model for predicting the next data point. In practice, machine learning models are often trained by splitting a dataset into two pieces, with one half of the data used to train the algorithm, and a second half used to test the performance of the algorithm. With a few exceptions, as the size of the dataset available to be used for training and evaluation of the model increases, so does the accuracy and granularity of the model's outputs.

In some ways, data are a natural resource, much like oil, which can be owned and traded. But data have the characteristics of a public good, which ought to be used as widely as possible to maximize wealth creation. Data are non-rivalling since they can infinitely be copied. They can be used by many people without limiting use by others. But they are also excludable. Technologies like encryption can control who has access to them. Depending on where one sets the cryptographic slider, data can indeed be private goods like oil or public goods like sunlight, or something in between, known as a 'club good'. Like oil, data must be refined to be useful. In most cases they need to be cleansed and tagged, meaning stripped of inaccuracies and marked to identify what can be seen, say, on a video. SCALE Ai, a startup in San Francisco, employs thousands of taggers around the world, mostly in low wage countries, to review footage from self-driving vehicles and ensure the firm's software has correctly classified things like houses and pedestrians. Before data can power Ai services, they also need to be fed through algorithms, to teach them to recognize faces, steer self-driving vehicles. And different data sets often need to be combined for statistical patterns to emerge.

In the second decade of 21st century, China is the land of face recognition. Since December 1st of 2019, all customers applying for an account with CHINA MOBILE must have their face scanned for proof of identity. The possession of users' face prints will let firms verify identities in real-time via smartphone cameras. Two very valuable startups, Megvii and SenseTime are Chinese Ai companies relying on machine learning. They do not ask their human coders to program computers with rules that distinguish between one face and another. Instead the coders provide the computer with masses of data about faces, usually photographs, and write software which trawls through those photographs looking for patters which can be used reliably to tell one unique face from another. The patterns picked up by that learning software make better rules for recognizing faces than anything a human coder could describe explicitly. Humans are good at recognizing faces but, with the right software computers can learn to be much better. Face-recognition software is much easier and cheaper to deploy than human recognizers. It just needs software, powerful computers and data. The trinity of Ai.

China's great advantage lies in data. Data alone are not much use for Ai. Data must first be labelled. This means that the data set must be endowed with the contextual information that computers need in order to learn statistical associations between components of that data set and their meaning to human beings. To learn to differentiate between cats and dogs, a computer is first shown pictures in which each animal is correctly labelled. To learn to distinguish between one person's face and another, a computer must first be shown what a face is, using labelled data, and then to tell the difference between cheekbones and brows, again via human labelling. Only with enough labelled instructions will it be able to start recognizing faces without human help. Underpinning companies like Megvii and SenseTime is a sprawling digital infrastructure through which data are collected, cleaned and labelled before being processed into the machine-learning software that makes face recognition tick.

MBH, one of China's largest data factories, employs 300,000 data labelers across China's poorest provinces. Each labeler works a 6hour shift each day, tagging a stream of faces, medical imagery and cityscapes. MBH pushes a stream of data to them as if a digital conveyor belt, and they churn through it, creating the syllabus from which machines learn. They do not choose which data to label but have them chosen for them. Distributing labelling work to be done efficiently, MBH uses a similar machine-learning AMAZON uses to recommend products to its customers. Instead of suggesting stuff to shoppers, MBH assigns labeling tasks to workers by gathering data from its workers as they carry out labelling jobs. The "machine-learning" records its workers' gaze, mouse movements and keyboard strokes. It also takes note of what sort of data-labeling task the worker is performing, from medical-imagery labeling to text translation. By measuring performance according to the type of task, it is able to identify workers who are better at some tasks than others, and steer those tasks to those workers. All of this happens automatically as MBH's customers feed tasks into the company, these systems let the army of data-labelers classify data almost in real-time. For TikTok for example, when TikTok's automated system cannot be sure the data is not pornographic, MBH shows the putative porn to thousands of human data-labelers to decide when they see it, and return their aggregated answer to TikTok less than a second.

MBH deploys wage arbitrage between the richest and the poorest locations in China by using the internet. In many ways MBH is a crowdsourcing platform connecting supply of labor with demand, like UBER. But unlike UBER, it is not

a local crowdsourcing platform. Many provincial governments of less developed China are keen to provide subsidies to MGH to open data factories in their less developed regions and offer much needed jobs. As demand for face-recognition labeling tasks decreases, labeling for medical imagery from which software can learn to diagnose diseases are on the increase. Whereas every human knows what a face looks like, not everyone understands what a tumor looks like film image. Labeling such conditions requires specialist's knowledge. There are also endless streetscapes which once labeled can teach autonomous cars about the cities they must navigate. Without data-labeling infrastructure Ai services cannot take off. Labeling services, like MBH, are what enabled ALIBABA to create a machine-learning service like TAOBAO's image-based product research. An ALIBABA shopper can take a photo of an item in a shop window and immediately be steered to a page where they can purchase it. ALIBABA processes a billion images like this a day. Cameras installed throughout stores track shoppers and identify the products they pay attention to and buy. Masses of labeled data are produced for machine-learning software. In September 2019, ALIBABA announced HANGUANG 800, a chip designed specifically to carry out such machine-learning tasks to be fabricated by TSMC, beating all other chips in its class. On November 6, 2019, MLPerf, an industry-standard benchmark for Ai chips published that HANGUANG 800 chip performed a standardized machine-learning task 13 times faster than INTEL's recent release. The comparison, experts claimed, was not totally fair, for HUANGUANG 800 was physically larger than INTEL's, and needed more power to perform more calculations per second. The oil metaphor rings true because some types of data and some of the insights extracted from them are already widely traded. Online advertising is perhaps the biggest marketplace for personal data. According to STRATEGY&, a consultancy, it was worth $178billion globally in 2018. Offering insights from mining data is FACEBOOK's and GOOGLE's business model. Yet data have failed to become a new asset class. Most data never change hands, and attempts to make them tradable have not yet taken off. Although data are often thought of as a commodity, corporate data sets, in particular, tend not to be fungible. Each is different in the way it was collected, and its purpose and reliability. This makes it difficult for buyers and sellers to agree on a price. A Further barrier to trading is that the value of a data set depends on who controls it. "There is no true value of data." declares Diane Coyle in the weıghtless world: strategıes for manaǵıng the dıgıtal economy (Coyle, 1997). "A working data economy is a continual transformation of data in meaningful information for decision-making. Three types of data for economic use are created today: operational data for business, government and other organizations; personalized data for marketing and surveillance; Big Data. By far the biggest part of data in the economy is that of the operational data for organizations. They are the main products of information and communication technology. Since the rise of the INTERNET PLATFORMS that provide free services in return for personal data, personalized data have become a second and growing part of the data economy, mainly used for marketing or advertisement and for the surveillance or control of citizens and consumers and businesses. In a few decades, all these data have been accumulated via the INTERNET with technical operations using artificial intelligence to create Big Data. They have produced ever more meaningful information for decision-making. In capitalist economy, data are usually appropriated by private companies. They monetize them and turn them into saleable assets. In fact, they can just easily be owned privately as publicly." (Dijk, 2020). As for personal data, defining property rights is tricky, because much information cannot be attributed to one person. Complicating matters, data have externalities, both positive and negative, meaning that markets often fail. Nevertheless, AMAZON's AWS launched a marketplace that aims to make trading data possible. It works like an online store for smartphone apps. Buyers subscribe to feeds, agree to licensing conditions, and AWS processes the payment. AWS represents a centralized model where all data are collected and crunched in a few places. Such centralization comes with costs. One is the steep fees firms have to pay when they want to move data to other clouds. Furthermore, concentrating data in big centers can be costly for the environment. Sending data to a central location consumes energy. And once there, the temptation is great to keep crunching them. SWIM Ai, on the other hand, is an example of what is being called EDGE COMPUTING where data are processed in real time as close as possible to where they are collected. Software now exists to move computing power around to where it works best. Applications such as self-driving vehicles need very fast-reacting connections and cannot afford the risk of being disconnected. The computing power needs to be nearby, particularly ıf the data is too large to be sent to a cloud. It is between these two poles that the infrastructure of data economy is expected to stretch. In lıfe after google: the fall of bıg data and the rıse of the blockchaın economy, George Gilder writes, "Under GOOGLE's guidance, the INTERNET is not only full of unwanted ads but fraught with bots and malware. Instead of putting power in the hands of individuals, it has become a porous cloud where all the money and power rise to the top. On a deeper level, the world of GOOGLE - its interfaces, its images, its videos, its icons, its philosophy - is 2D. GOOGLE is not just a company but a system of the world. And the internet is cracking under the weight of this ideology. Its devotees uphold the flat-universe theory of materialism: the sufficiency of deterministic chemistry and mathematics. They believe the human mind is a suboptimal product of random evolutionary process. They believe in the possibility of silicon brain. They believe that machines can "learn" in a way comparable to human learning, that consciousness is a relatively insignificant aspect of humanity, emergent from matter, and that imagination of true novelties is a delusion in a hermetic world of logic. "(Gilder, 2018). Data-handling software and cloud computing are increasingly enabling what George Gilbert calls Ai-SSEMBLY LINE, in reference to what happened a hundred years ago, when electricity replaced steam as the main source of power in factories. Before, machines had to be grouped closely around the power source – a steam engine. Electricity then allowed power to be distributed to where it was needed, which made assembly lines feasible. What is happening now, however, is actually the inverse. The machines of the digital age – a firm's business applications and software to build these – are virtually regrouping around a new power source central digital repositories known as data warehouses or data lakes. In time this may allow companies to build entire digital twins of themselves. Integrating data was already a major problem when IT existed mainly to keep track of a firm's transactions, such as processing an order or managing the supply chain. It has only become more difficult since. In the 1990s firms started using their data to work out how they have been doing, something called analytıcs. A decade ago, they turned to mining their data to make predictions about their business, an approach first dubbed BIG DATA, and now Ai. Today a firm's data are often not just spread across many local databases, but live in different cloud services and stream in from third parties and connected devices. It is the data warehouses and data lakes that are making it easier to use the digital stuff. They differ in the way they structure information. The first takes a more rigid approach than the second, and both can live in the cloud. This makes them not only less expensive to manage, but they can easily be fed with data from many different sources and used by many different users. One such is made by snowflake, another startup, which has turned its data warehouse into what it calls DATA platform that can stretch it across different computing clouds. AWS of Amazon and AZURE of MICROSOFT offer similar products. Yet, another development in specialized databases; since data come in real-time digital streams, they have to be treated differently. CONFLUENT, a startup, sells cloud services based on APACHE KAFKA, an open-source program which analyze these streams and dump them into DATA LAKES. A third group of software and services turns all this into Ai-SSEMBLY LINE. Some of these tools prepare data crunching, others make it easy to design and train an Ai algorithm, deploy it in an application to automate decisions and continuously improve it. ENEL, a utility, has used such tools to identify the power thieves it need to go after. SHELL, an oil company, has designed algorithms that ensure that its thousands of spare parts are available around the world. And KIVA, a non-profit lender, has built a data warehouse with SNOWFLAKE that allows it to make better decisions about who should receive its loans. OPEN DATA movement, on the other hand, champions push organizations and universities to give away their data so they can be widely used. Some see such efforts as the beginning of an open-source movement for data, much like the approach that now rules large parts of software industry. MICROSOFT is keen to see this happen. For personal data, the main limitation is the increasingly strict privacy laws, such as the eu's general data protectıon regulatıon (gdpr) as well as calıfornıa consumer prıvacy act (CCPA). The data economy is already very unequal. It is dominated by a few big platforms. Amazon, Apple, Alphabet, Mıcrosoft, and Facebook made combines profit of $55billion, more than next 5 most valuable American tech firms in 2019. This corporate inequality is largely the result of network effects: economic forces that lead to size beget size. As data expands, these sorts of dynamics will increasingly apply to non-tech companies and even countries. America and China account for 90% of the market capitalization of the world's 70% largest platforms. The rest of the world risk becoming mere providers of data while having to pay for the digital intelligence produced. That is what Unıted Natıons conference on trade and development warned. Humans are expected to distil data into information, information into knowledge, and knowledge into wisdom. But, Dataısts believe that humans can no longer cope with the immense flows of data, hence they cannot distil data into information, let alone into knowledge or wisdom. The work of processing data should therefore be entrusted to electronic algorithms whose capacity far exceeds that of human brain. Dataısts, skeptical of human knowledge and wisdom, prefer to put their trust in bıg data and computer algorithms. It was biology's embrace of Dataısm that turned the breakthrough in computer

science into a possibility that may transform the very nature of life. Not only individual organisms are seen today as data processing systems, but also entire societies such as beehives, ant hills, bacteria colonies, forests and human cities. Markets are data processing systems, as HAYEK reminded us half a century ago when he argued for its superiority over central planners. According DATAISTS, free market capitalism and state-controlled communism are not competing ideologies, ethical creeds or political institutions. They are in essence, competing data processing systems. Capitalism uses distributed processing, whereas communism relies on centralized processing. So do managerial dictatorships and market chaos.

Computers and other digital advances are doing for mental power, the ability to use our brains to understand and shape our environments, what the steam engine and its descendants did for muscle power. They are allowing us to blow past previous limitations and taking us into new territory. Daniel Dennett in FROM BACTERIA TO BACH AND BACK: THE EVOLUTION OF MINDS (Dennett, 2017)[1] tells the tale of human neurons, distant relatives of tiny yeast cells that are themselves distant relatives of even simpler microbes are organized in structures that are capable of astonishing feats of creativity by revisiting and extending half a century of work on the topic. Just as computers can perform complex calculations without understanding arithmetic behind it, so creatures can display finely tuned behavior without understanding why they do so. COMPETENCE WITHOUT COMREHENSION. People do not have a special faculty of comprehension. Rather, the human mind has been enhanced by the process of cultural evolution operating on memes. Memes are behavior that can be copied. Words are a good example. Words and other memes gave humans powerful new competences in communicating, explicit representation, reflection, self-interrogation and self-monitoring. To use a computer analogy, memetic evolution provided "thinking tools"- a bit like smartphone apps – which transformed humans into comprehending intelligent designers, triggering an explosion of civilization and technologies.

Daniel Dennett expects that computers will continue to increase in competence but doubts that they will soon develop genuine comprehension, since they lack the autonomy and social practices that have nurtured comprehension in humans. The so-called super-intelligence does not succeed by deeper understanding of the games of GO, CHESS, or ATARI, to cite most fashionable examples. Super Ai succeeds vastly accelerating the speed of game playing, capturing much of the possibility space of bounded and deterministic regime. Daniel Dennett worries that people may overestimate the intelligence of their artifacts and become over reliant on them and that the institutions and practices on which human comprehension depends may erode as a result. How exactly this transition will play out remains unknown. Rapid and accelerating digitalization is likely to bring economic disruptions. Orthodox neoclassical toolbox you acquired will not be much help unless, block chain technology creates a virtual decentralized reality, platonic habitat for HOMO ECONOMICUS. Neoclassical market fundamentalists' utopia, but dystopia for others. There have been two decisive events in the history of our planet according to James Lovelock. He wrote in NOVACENE: THE COMING AGE OF HYPERINTELLIGENCE (Lovelock, 2019)[1]. The first was about 3.4billion years ago when photosynthetic bacteria first appeared. Photosynthesis is the conversion of sunlight to usable energy. The second was in 1712 when Thomas Newcomen build a steam-powered pump. It burned coal and used heat produced to boil water into steam which was let into a cylinder with a movable piston. The piston rose and then cold water from a stream nearby was sprayed into the cylinder. The condensed, the pressure dropped and the piston moved back to its starting position, doing a substantial amount of work in process and clearing the mines of water. This little engine did nothing less than unleash the industrial revolution. This was the first time that any form of life on Earth had purposefully used the energy of sunlight to deliver accessible work and do so in a way that was profitable. This ensured growth and reproduction.

Though the term INDUSTRIAL REVOLUTION is accurate enough, a better name ANTHROPOCENE covers the domination of human power over the entirety of the planet for 300 years from Newcomen's installation of his steam pump until now, according to James Lovelock. ANTHROPOCENE is a new geological period when humans first began to convert stored solar energy in coal into useful work. This makes ANTHROPOCENE the second stage in the planet's processing of the power of the Sun. In the first stage the chemical process of photosynthesis enabled organisms to convert light into chemical energy. The third stage, James Lovelock calls NOVACENE, is when solar energy is converted in to information. In the NOVACENE new beings will emerge from existing artificial intelligent systems. They will think many times faster than we do and they will regard us as we now regard plants. But this will not be the cruel violent machine takeover of the planet imagined by science fiction. These hyper intelligent beings will be as dependent on the health of the planet as we are. Others refer to the third stage as the third industrial evolution.

After four billion years of organic life evolving by natural selection, science is ushering in the era of inorganic life shaped by intelligent design, and the designers are human scientists. The combination of biotechnology and Ai might result in physical and mental traits that completely break free of the hominid mold. Yuval Noah Harari in HOMO DEUS: A BRIEF HISTORY OF TOMORROW (Harari, 2017)[1] warns. We still share most of our bodily structures, physical abilities, and mental faculties with Neanderthals and chimpanzees. Not only our hands, eyes, and brains distinctly hominid, but also are our lust, our love, our anger, and our social bonds.

4. The birth of network science and the dialectic evolution of the internet: from global commons to monitized private enclosures' incarceration of data in their clouds, and to the emergence of splinternet arresting data within political borders

"The WWW is a network whose nodes are documents and whose links are the URLs that allow us to "stuff" with a click from one web document to another. With an estimated size of over one trillion documents (N=10 to 12th power), the Web is the largest network humanity has ever built. It exceeds in size even the human brain (N=10 to 11th power neurons). It is difficult to overstate the importance of the WWW in our daily life. Similarly, we cannot exaggerate the role the WWW played in the development of network theory: it facilitated the discovery of a number of fundamental network characteristics and became a standard testbed for most network measures.", informs Albert-Laslo Barabasi in NETWORK SCIENCE (Cambridge University Press, 2016) In INFORMATION RULES: A STRATEGIC GUIDE TO NETWORK ECONOMY (Shapiro and Varian, 1999)[1], Carl Shapiro and Hal Varian popularized the term NETWORK EFFECT which came to mean that in digital world size easily begets size. Hal Varian has been described as the Adam Smith of the discipline of GOOGLENOMICS and the godfather of GOOGLE's advertising model.

"To understand what networks really are and how they 'behave', we have to realize that they have particular structural properties. These can be summarized in a number of 'laws' of the Web. They are not some kind of natural laws. These are defining and enabling conditions that exert pressure on human behavior in networks, but that can also be changed, as usually happens to structures according to structuration theory. Understanding these 'laws' helps to explain things we can observe on the Web and it Assists in finding mechanisms to intervene in the network structures concerned. Seven laws that summarize a large part of the general theoretical argument are: the law of network articulation (In the network society, the social relations are gaining influence as compared to social units they are linking.); the law of network externality (Networks have effects on things/people external to the network. The more people participate in a network the more others are likely to join. There is a pressure to connect.); the law of network extension (When networks such as the Web grow, they tend to become too big. Network units lose oversight and do not reach each other anymore. To solve this problem intermediaries, such as search engines, portals, and social networking sites are necessary.); the law of small worlds (In large-scale networks, most units are not neighbours, but still can reach almost every other unit in a few steps (six degrees of separation) creating a small world. Explanation: units are grouped in clusters with strong ties, and they reach people in other clusters by long-distance and often weak ties. Taking these steps, the influence of people by contagion reaches three degrees.); the law of the limits to attention (As everybody in a network is able, in principle, to connect and communicate to everyone else in the network, there is a limit to attention because the time to read, listen, or view for receivers runs out. The more people write/produce content on the Web, the smaller on average their audiences become.); the power law in networks (In large, scale-free networks those units already having many links acquire even more, while most units keep only a few links. The mechanisms are a continuous growth of links, preferential attachment and social contagion.); the law of trend amplification (Networks are relational structures that tend to amplify existing social and structural trends. When technologies such as ICT networks and computers are used, they serve as reinforcing tools.)", informs Jan van Dijk in THE NETWORK SOCIETY (Jan van Dijk, 2012).

Jack Goldsmith and Tim Wu in who controls the ınternet: ıllusıons of a borderless world (Oxford University Press, 2008)[1] tells the story of the death of the dream of self-governing cyber-communities that would escape geography,

forever. and also tells the story of the birth and early years of a new kind of INTERNET, a bordered network where territorial law, government power, and international relations matter as much as technological invention. As China and America wall off their respective digital markets from one another, each are looking for growth in the rest of the world. A divided world wide web or SPLINTERNET is already a reality, as China's internet grows behind a great firewall of censorship. AMAZON is promoting payment services in India. China's ALIPAY service is active in Brazil.

The INTERNET has become a new kind of battleground for the world's great powers. No longer a single entity, the INTERNET is becoming a SPLINTERNET as the Unites States and China fight to control the way in which it will be run and regulated, as part of a larger rivalry to control high-growth high-tech industries. Both rivals are increasingly nationalistic, supporting their own home grown companies in an effort to win the tech cold war by ring-fencing some of their supply chains to prepare themselves for a long-term tech and trade war. Emphasizing the organization and the relation of elements entails less attention to the elements and units themselves. The characteristics of units and elements among them human individuals, and the way they are made up, are not the focus of attention. Instead every network approach in the natural and social sciences stresses the relations of elements. It is opposed to atomistic views of reality and methodological individualism of orthodox economic theory which measures social reality by adding individual attributes. Hence, orthodox economic theory is not useful, actually distorting understanding of networks.

ARPANET, funded by PENTAGON, was the brainchild of Paul Baran of the RAND CORPORATION who relied on the idea called packet switching. Baran's main goal was to develop something that would survive a Soviet first strike and still transmit messages to missile bases to retaliate. Hence the decentralized nature of the network. The INTERNET is more than packet switching. It requires computers, communications, all sorts of software and other protocols, many of which the government-funded research projects bought from the private sector. The ARPANET was effectively privatized in the 1990s.

Paul Baran for packet switching, Vint Cerf for writing TCP/IP protocols that proved crucial in allowing different programs to run on the INTERNET, and Sir Tim Berners Lee for developing the worldwide web were instrumental in the emergence of an open means of connecting computers to each other so that people could see what was on other nodes than their own hard drive.

To understand the internet's recent history, it helps to keep in mind that like most digital systems, it is designed in layers. At the bottom are all the protocols that allow different sorts of networks and devices to exchange information, or INTERNETWORK; hence INTERNET. At that level, it is still largely decentralized. No single company controls these protocols, although the number of firms providing internet access has dropped sharply. The INTERNET's base was designed to move data around and publish information, so its protocols did not record what had been transmitted previously by whom.

The INTERNET was built without memory. The INTERNET's arrival seemed to herald a new way of ordering human affairs that would free us from the tyranny of territorial rule. Self-governing cyber-communities would escape geography forever. It was to rely in open source, peer-to-peer networking. The INTERNET was created by, and continues to be shaped by, decentralized groups of scientists and programmers and hobbyists freely sharing the fruits of their intellectual labor with the world. OPEN-SOURCE collaborative network created a very large portion of the lines of code on which the INTERNET depends, and not just the INTERNET, but smartphones, stock markets, and airplanes. But the last decade has shown that national governments have an array of techniques for controlling offshore INTERNET communications, thus enforcing their laws, by exercising coercion within their borders.

"Tim Berners Lee, a creator of the web, thinks the INTERNET itself is dying. In 2014 the web took a very dark turn. Beforehand, traffic to websites came from many places and the web was a lively ecosystem. But starting in 2014, over half of all traffic started coming from FACEBOOK and GOOGLE. Five years later, over 70% of traffic was dominated by these two sources." (Tepper and Hearn, 2019). "The INTERNET was meant to be open, anarchic, decentralized, and above all free. In the 1990s, AMERICA ON LINE helped people get online and discover content. It was a walled garden. AOL determined and curated the user experience, which was contrary to the spirit of the web. Once users started going online with their local cable company, GOOGLE helped them find anything on the web, most consumers did not go back to AOL.

FACEBOOK has become AOL 2.0, a centrally designed internet for its users. You discover only what the company wants. It is as restraining as AOL with a lock on user's life history, photos, friends, and family connections. Countless articles and videos appear only behind FACEBOOK's guarded gate. FACEBOOK has become a digital passport, and many apps and sites will not let a user join without a FACEBOOK account." (Teeper and Hearn 2019).

"There is now a vast imbalance of power between individuals and private companies. The web is no longer free when two companies control most of the traffic. …. Faced with a closed web controlled by two private companies, users are demanding that FACEBOOK and GOOGLE fix themselves. As Matt Taibbi has succinctly put it, 'For GOOGLE and FACEBOOK to be the cause of and the solution to problems tells you how irrelevant governments and regulators have become.' (Tepper and Hearn, 2019). INTERNET has split apart and is becoming bordered. Far from flattening the world, the INTERNET, its language, its content, its norms, is conforming to local conditions. The result is an INTERNET that differs among nations and regions that are increasingly separated by walls of bandwidth, language, and filters. This bordered INTERNET reflects top-down pressures from governments that are imposing national laws on the INTERNET within their borders. It also reflects bottom-up pressures from individuals in different places who demand an INTERNET that corresponds to local preferences, and from the web page operators and other content providers who shape the INTERNET experience to satisfy these demands.

The INTERNET's design was not the result of some grand theory or vision that emerged fully formed. Rather, open design of the INTERNET was necessitated by the particularities of the specific engineering challenges. The INTERNET's creators, mainly academics operating within and outside the government, lacked the power or ambition to create an information empire. They faced a world in which the wires were owned by AT&T and computing power was a patchwork of fiefdoms centered on the mainframe computers, each with idiosyncratic protocols and systems. The construction and maintenance of networks were and are tasks largely performed or contracted out by network operators and carriers. The network operators and carriers serve as gatekeepers for networks. Telephone operators, Internet platforms, Internet service providers and broadcasting operators largely decide who and what has access to networks and how expensive particular applications on networks are. "In the last three decades, the world market for telecommunications and computer network equipment has been controlled by 10 companies. Important names in this content are HUAWEI, CISCO SYSTEMS, ALCATEL-LUCENT (NOKIA), FUJITSU, and ERICSSON in 2020. These companies involved have to make extraordinarily capital-intensive investments and they have extremely high research and development costs. Therefore, high turnovers and profits are required. This is a problem because profit margins on hardware are much lower than those on software and services in the information and network economy. Usually they are less than 2% or 3% of total revenue. Considering the production of terminal equipment (telephones, computers, modems, decoders, radios, and televisions), big companies are also on the rise, and for the same reasons: ow profit margins. The giants of computer equipment manufacturing in 2020 are LENEVO, HP, APPLE, DELL, SAMSUNG, ACER, and ASUS. Four of the are East Asian and three are American." (van Dijk, 2020).

Successful implementation of WASHINGTON CONCENSUS in 1980s and 1990s privatized big national public monopolies in telephony and broadcasting and split them into parts with different functions, such as a carrier or a content provider. "However, after 2000, a second trend of monopolization in the form of oligopolization recurred in the private sector. The trend in operating and carrying telephony and broadcasting has gone from public monopolies to private oligopolies. Public monopolies acted on a national scale. Contemporary private oligopolies increasingly operate on an international level. In fixed telephony, they are companies such as AT&T, China TELECOM, NTT, VERIZON, DEUTSCHE TELECOM, and TELEPHONICA. In mobile telephony, they are among others CHINA MOBILE, AIRTEL (India), VODAFONE (UK), TELEFONICA (Spain), and AXIETA (Malasia). In broadcasting companies such as TIME WARNER, NEWS CORPORATION (Murdoch), BERTELSMANN, CANAL+, UPC (Liberty Global) and MICROSOFT NBC dominate the international market. There are no complete monopolies in telephony and broadcasting – basically, there is competition – but companies can split the world market among themselves, fix prices and benefit from international regulations on standardization and interconnectivity. Increasingly, large international telephone and broadcasting companies cooperate and merge.

A handful of conglomerates are preparing to divide the world market. The final result will be a replacement of a national government-controlled public monopoly without competition by a small number of international private oligopolies with limited competition and scarcely any public responsibility. Operators and providers on the Internet are either concentrated and big or fragmented and small. The internet platforms, increasingly the core of all network producers have become oligopolies right from the beginning. They are the Big Five American platforms–Apple, Amazon, Alphabet (GOOGLE), MICROSOFT, FACEBOOK and the giant Chinese platforms – ALIBABA and JINGDONG for e-commerce, TENCENT for communication and BAIDU as earch engine. Platforms from other countries are much smaller. The data companies and cloud computing services are also concentrated. There is a close relation with the Internet platforms. The biggest in 2020 are Amazon web services, Microsoft, GOOLE and ORACLE. Instead, at the start, the Internet providers were relatively small and fragmented on a local scale. There were countless Internet service providers (ISPs) in the world. After some time, they also merged with privatized national telephone carriers and big private carriers."(Dijk, 2020).

Internet works over an infrastructure that does not belong to those using it. The owner is always someone else, and in the 1970s, it was generally AT&T in the United States. It was designed to link human brains, but it had no control over their activities than that. Egalitarianism born of necessity would persist as the network grew over decades to include everyone.

The concept of ENCAPSULATION was how a network interconnected with other networks. It means wrapping information from local networks in an envelope that INTERNETWORK could recognize and direct. In what would come to be known as TRANSMISSION CONTROL PROTOCOL (TCP) created a standard for the size and flow rate of data packets, thereby furnishing computer users with a LINGUA FRANCO (ESPERANTO) that could work among all networks. As a practical matter, this innovation would allow the INTERNET to run on any infrastructure, and carry any application, it packets traveling any type of wire or radio broadcast, even those owned by an entity as given to strict controls as AT&T.

It was an electronic information network independent of the physical infrastructure over which it ran. The invention of ENCAPSULATION permitted the layered structure of the INTERNET, whereby communications functions are segregated allowing the network to negotiate the differing technical standards of various devices, media, and applications. This was also born of necessity to link different types of networks by inventing a protocol that took account of the existence of many networks over which the creators had limited power.

TRANSMISSION CONTROL PROTOCOL/INTERNET PROTOCOL (TCP/IP) and other aspects of the INTERNET's architecture rested on the founders' beliefs about networks. In technical jargon, they created a network with OPEN ARCHITECTURE, or END-TO-END DESIGN. In non-technical terms, the founders embraced a design that distrusted centralized control. In effect, they built strains of American liberalism, and even 1960s idealism, into the universal language of INTERNET. The INTERNET's design was open, minimalist and neutral. It was open, because it was willing to accept almost any kind of computer network to join in one universal network-of-networks. It was minimalist, because it required very little of the computers that wanted to join in. Finally, it was neutral between applications.

The concept of network neutrality grew out of the END-TO-END DESIGN structure of the INTERNET, which favored the users rather than the network providers. While users pay for INTERNET connection, and the price they pay can depend on the speed or quality provided by their INTERNET service provider, once connected, their transmitted packets are treated the same way everyone else's by the network providers. Network providers are trying to secure control of information exchanged over the INTERNET for commercial gain. Proponents of network neutrality argue that the network should remain "stupid", thereby allowing end users to collaborate and innovate by developing their own applications. This DISTRIBUTED INTELLIGENCE that makes the INTERNET such a unique communications medium. The governments and the network providers feel differently. In 2011, Russia, Uzbekistan, Tajikistan and China submitted a proposal to the United Nations General Assembly calling for an international code of conduct for the information society. The preamble to the proposal states that "policy authority for INTERNET related public issues is the sovereign right of states." As of 2019, nations pushing for new forms of government control increased to include India, Brazil, South Africa and Saudi Arabia. The INTERNET plays a central role in the American economy as it does İn the Chinese. But there is a profound flaw in its architecture. Its software stack lacks a trust and transactions capability. Its Open System Interconnectıons (OSI) model defines seven layers. While some of the layers have merged, none of the existing layers provide trust or validation or factuality or veracity of real monetary values. Perhaps, that abides well with the theoretical mainframe of the MBA programs: the money neutral neoclassical economic theory. The original distributed Internet architecture sufficed when everything was "free", as the Internet was not a vehicle for transactions. When all it was doing was displaying WEB pages, transmitting emails, running discussions forums and news groups, and hyperlinking academic sites. The NET did not absolutely need a foundation of security. But when the Internet became a forum for monetary transactions, new security regimes became indispensable. The groups which developed the original protocols, the ınternet engıneerıng task force and the World Wıde Web could have added security regimes to the rule book. But they did so, only belatedly. Perhaps, one reason was that many internet pioneers believed that the protocols would have been enough to prevent centralization. They were proven wrong. To understand the contemporary INTERNET, one needs to start with STACKs which imitate hardware and transcend it in virtual threads and cores and chains. The seven-layer NETPLEX scheme of the Open Systems Interconnectıon model of the Internatıonal Standards Organızatıon consists of a hierarchical stack in which lower functions are controlled by higher functions. At the bottom is the physical layer, the fiber-optic lines, microwave oscillators, mixers, 1550 and 900-nanometer lasers, photodetectors, silicon routers, erbium-doped amplifiers, and twisted-pair telephone wires, antennas, coaxial cables – the list is endless – that carry the data packets across the network at the behest of the layers above it.

In OSI stack, above the physical layer is the Datalınk. This is the medium where hardware becomes "firmware" and software that define the electrical specifications, timing rules, and electron-photon conversions that enable the transmission of information across a link from one node or computational address to the next. switches operate at level two, passing packets only to the next node. Local area networks such as Ethernet or WiFi function at this level. The third layer is the NETWORK layer, the domain of routers, which combines with the transport layer (layer four) to establish the end-to-end links that constitute the TPC/IP Internet Protocols. This is the entire system of IP addresses and Transport Control Protocol traffic shuffles that comprises the connections from end to end across the NET.

Layer three does the headers on the packets, the identities and addresses. Layer four does the actual transmission and reception of data packets and traffic management, load balancing and ACKS (I got it!) and NACKS (I'm still waiting) that assure connections. Layers three and four tend to be the bastion of central powers, where governments and their intelligence arms chase down domain names and addresses. Layer five governs a particular two-way communication from beginning to end, whether a video stream, a SKYPE call, a Sessıon Inıtıatıon Protocol conference, a messaging exchange, an email post, or a transaction. Layers six and seven are the schemes for presentations and applications – user interfaces, windows, formats, operating systems. These are summed up in schemes of hyperlinks. The 70% of all links came to be handled through Google and Facebook, major walled gardens.

The INTERNET needs a new payment method that conforms to the shape and reach of global networking and commerce. It is to obviate the constant exchange of floating currencies, more volatile than the global economy that they supposedly measure. The new system should be distributed as far as INTERNET devices are distributed: a dispersed heterarchy based on peer-to-peer links between users rather than a centralized hierarchy based on national financial institutions. It is invented and called Bıtcoın Blockchaın.

On top of the existing seven layers of Internet infrastructure, the Bıtcoın ledger builds a new layer of functionality – layer 8 – just as hypertext transfer protocol (http) builds network layer on the Transmıssıon Control Protocol /Internet Protocol (TCP/IP) network layer. This new transactions layer allows for the separation of the security and identification functions from the network. Based on new breakthroughs in information theory, security can be heterarchical rather than hierarchical – distributed on millions of provably safe devices beyond the network and unreachable from it. It is a security paradigm diametrically opposed to existing morass of passwords, usernames, PINS, personal tokens, and post-hack fixes on the network. In a Bıtcoın transaction, there is no more need for the disclosure of personal information than in cash transactions.

With the ascendancy of AMAZON, APPLE and other on line emporia early in the 21st century, much of the INTERNET was occupied with transactions, and the industry retreated to the CLOUD. Abandoning the distributed INTERNET architecture, the leading Silicon Valley entrepreneurs replaced it with centralized and segmented subscription systems, such as PAYPAL, AMAZON, APPLE's iTUNES, FACEBOOK, and GOOGLE's CLOUD. UBER, Airbnb, and other UNICORNS followed. These centralized fortresses violate the COASE THEOREM OF CORPORATE REACH. "Business should internalize transactions only to the point that the costs of finding and contracting with outside parties exceed the inefficiencies incurred by the absence of real prices, internal markets, and economies of scale.", states the theorem. The industry sought safety in centralization, but centralization is not safe. It turned out to be.

Distributed organizations are as old as the INTERNET. Its first users some 50 years ago realized how much can be done by swapping emails and digital files. These exchanges led to the development of OPEN SOURCE. Software, jointly written by groups of strangers geographically distant. Today, most distributed startups have OPEN SOURCE roots, GATSBY is one. Nearly all 1200 employees of AUTOMATTIC, best known for WordPress, software to build websites, work from home. GitHub, which hosts millions of OPEN SOURCE products that was acquired by MICROSOFT in 2018 may be the world's biggest distributed enterprise. Two thirds of 2000 staff work remotely. Most firms that build blockchains, a type of distributed database, are by their nature dispersed.

Joel Gascoigne, the director of BUFFER, which helps customers manage social-media accounts, works remotely from Boulder, Colorado. STRIPE, an online-payment firm, has its headquarters in San Francisco and its engineering hub is a collection of remote workers. d:code:it, a Fin-Tech, has its head office in London and its design studio in Vienna. Distributed startups exist because of a panoply of digital tools, most obviously corporate-messaging services such as SLACK (chat) and ZOOM (videoconferencing) as lesser known firms like MIRO (virtual whiteboards for brainstorming) or DONUT, which pair employees to forge personal bonds. Others like PROCESS STREET, CONFLUENCE or TRELLO, help manage work flow and keep track of what goes on in virtual corridors, crucial when people do not share the same physical space. Firms offering organizational scaffolding for distributed firms include RIPPLING, which manages payroll and employee benefits, grants workers access to corporate services and sets up their devices.

GOOGLE developed the integrated model of reality combining a theory of knowledge, named BIG DATA, a technological vision, CENTRALIZED CLOUD COMPUTING, a cult of commons rooted in OPEN SOURCE software. The GOOGLE theory of knowledge, BIG DATA, is as radical as Newton's as intimidating as Newton's was liberating. Newton proposed a few relatively simple laws by which any new datum could be interpreted and the store of knowledge augmented and adjusted. Hundreds of thousands of engineers have added and are adding to the store of human knowledge by interpreting one datum at a time. John Gribbin, in DEEP SIMPLICITY: BRINGING ORDER TO CHAOS AND COMPLEXITY (Gribbin, 2004)[1], shows how chaos and complexity permeate the universe on every scale, governing the evolution of life and galaxies alike. Far from overturning all that has gone before, chaos and complexity are triumphant extensions of simple scientific laws.

BIG DATA's approach is different. The idea of BIG DATA is that the previous slow, clumsy, step-by-step search for knowledge by human brains can be replaced if two conditions are met. All the data in the world can be compiled in a single "place", and algorithms sufficiently comprehensive to analyze them can be written. Upholding this theory of knowledge is a theory of mind derived from the pursuit of artificial intelligence. In this view, the brain is also fundamentally algorithmic, iteratively processing data to reach conclusions. Belying this notion of the brain are the studies of actual brains which show human brains to be much more like sensory processors than logic machines.

Iain McGilchrist argues in THE MASTER AND HIS EMISSARY: THE DIVIDED BRAIN AND THE MAKING OF THE WESTERN WORLD (McGilchrist, 2010)[1] that one's feelings are not reaction to, or a superposition on, one's cognitive assessment, but the reverse: the affect comes first, the thinking later. We make an intuitive assessment of the whole before any cognitive process come into play, though they will, no doubt, later be used to 'explain' and justify, our choice. We make an assessment of the whole at once, and pieces of information about specific aspects are judged in the light of the whole, rather than the other way around. The implication is that our affective judgement and our sense of the whole, depend on the right hemisphere, occur before cognitive assessment of the parts, the contribution of the left hemisphere of the brain. Marvin Minsky in the emotıon machıne: commonsense thınkıng, artıfıcıal ıntellıgence, the future of the human mınd (Minsky, 2006) offers a nuanced version.

The CLOUD is the great new heavy industry of gargantuan data centers composed of immense systems of data storage and processors, linked together by millions of miles of fiber optic lines and consuming electric power and radiating heat to an extent that exceeds most industrial enterprises in history. In 2006, GOOGLE purchased ANDROID, an OPEN-SOURCE OPERATING SYSTEM that is endowing companies around the world with ability to compete with iPHONE. As ANDROID thrives, two things become apparent. The INTERNET may have ushered in a new age of sustainable open systems, but as APPLE have shown an integrated closed system monopoly remains as irresistible as ever.

The next layer up has become more concentrated, including many consumer services, from on line search to social networking. Centralization is rampant in what could be called the "third layer" of the INTERNET. All of its the extensions has spawned. APPLE's iOS or GOOGLE's ANDROID are what most people use as their smartphones' operating system. AMAZON, GOOGLE and MICROSOFT are the major competitors in cloud services outside of China. ALIBABA has a strong global lead in cloud services. In 2017 ALIBABA captured 45% of China's fledging cloud services market worth 69billion yuan ($10billion) compared to 10% for TENCENT according to BLOOMBERG. TENCET's WeChat, however, is on 4 in every 5 Chinese smartphones, and thus offers multiple products and a massive market for firms.

FACEBOOK may be the world's largest social network, but TENCENT's broad product based business model and technology is, by many measures, far superior. Less than 20% of TENCENT's revenue comes from online advertising, 98% of FACEBOOK's revenue, the other hand, is from online advertising. TENCENT has a digital assistant, XIAOWEI, a mobile payment system, TENPAY, and a cloud service, WEIYUN and also launched a movie studio, tencent pıctures. In 2007, it introduced a cloud-based platform that allows companies to offer services to users in WeChat via 'mini programs' (i.e. tiny apps.). More than 1million such 'mini programs' are used by over 200million people every day, and most of them are WeChat users. TENCENT's revenue from such mini programs, for now, is marginal, and furthermore, competitors like Bytedance, are crowding what is on the offer with their 'mini programs'.

ANT FINANCIAL's MYbank TENCENT's WeBank are growing fast. Both have used automation, machine-learning and troves of data to define identification and security standards crucial as banks and payments move on line. WeBank's facial-recognition tool has an error rate of less than one in a million, the human eye averages 1%. MYbank in 2018 served 20million of the country's SMES. MYbank also rents its kit to 200 other banks and hopes to use Hong Kong and Singapore as testing grounds for those skills abroad. Investors think internationalization has promise: ANT FINANCIAL, which is private, was valued at $150billion in its latest funding round. WeBank is taking a different track. It is making the infrastructure it created available on an open-source basis, so foreign banks can build upon it.

PING AN, the Chinese insurer has decided to become a cloud company with 32 stand-alone businesses to help export the tech it hones at home. OneConnect, an offspring, that listed in2019 in New York, supplies the artificial brain and nervous system of financial firms that go digital. It serves China's top lenders and 99% of the next tier down. The firm offers cloud-based services that cover everything, from back office to client-facing tasks. It belongs to a new breed of Chinese firms that are re-welding the pipes channeling money in the developing world.

Quick success develops its own downside is a folk-wisdom. In February 2019 in America, Bytedance, the parent of TikTok paid $5.7million fine for illegally collecting data on users under the age of 13, and in April an Indian court banned the app on the grounds that it abets sexual predators. Bytedance's largest market outside China is in India where 2 of 5 TikTok users live. TikTok, short-video app no Western teenager can do without these days, stresses its independence from authorities in Beijing. Its parent company less so. Bytedance whose valuation in 2019 makes its world's biggest unlisted startup, has teamed up with Shanghaı Dongfang Newpaper Company, a state-run publisher.

The joint venture, in which Bytedance holds a 49% stake, will among other things, develop Ai technologies. Natural though it may appear in China, the joint venture comes weeks after President Trump's government opened a national security review of TikTok on worries that it gives Beijing access to data on millions of Americans and censors content the regime does not like

BYTEDANCE insists that data on non-Chinese users sit on non-Chinese servers and what Americans are or aren't shown is decided in America.

BYTEDANCE is not the only big Chinese tech firm that works closely with state-owned enterprises, especially in Ai that the Communist Party regards as strategic. In 2016, BAIDU agreed to develop technologies with state-owned telecoms firms. In June 2019, Jack Ma of ALIBABA started discussions with SASAC, a government body that oversees state-owned enterprises to develop tie-ups to promote digital innovations with state-owned telecom firms. TENCENT has been urged to do the same according SOUTH CHINA MORNING POST.

According to SOUTH CHINA MORNING POST's ABACUS, BAIDU, ALIBABA, TENCENT (BAT) hold stakes in 150 companies abroad. ALIBABA has 56 data centers overseas, according to ABACUS, and TENCENT's equity in SNAP is 17.5% and 7.5% in SPOTIFY. But in 2018, THE COMMITTEE ON FOREIGN INVESTMENT IN THE UNITED STATES, (CFIUS), blocked several Chinese firms' investments, largest being $1.2billion purchase of MoneyGram by ALIBABA's ANT FINANCIAL. In 2019, Chinese firms' investments in America fell below $5billion. It was $46billion in 2016. So far, President Trump's MAGA policies seem to be set to defer global spaghetti-like financial entanglements, not untangle them.

The data giants, AMAZON, FACEBOOK and GOOGLE, as they dominate their respective core markets, they also have accumulated more digital information than any other Western company. They use the information they store to sell targeted advertising and to fuel the development of their artificial intelligence (Ai) services. At its core, GOOGLE is a list of websites and a database of people's search histories. FACEBOOK keeps track of their users' identity and interactions among them. AMAZON collects credit-card numbers and purchasing behavior.

These data giants' capacities to process, transmit and store data are growing by explosive increments. Scientists define an explosion as the injection of energy into a system at a pace that overwhelms the system's ability to adjust. This produces a local increase in pressure, and if the system is unconfined or the confinement can be broken, shock waves develop and spread outward. These explosive increments are injecting pressure into the prevailing socio-economic systems via job displacement faster than the prevailing socio-economic systems can absorb it via job replacement. The explosive potential emerges from the mismatch between the speed at which disruptive energy is injected into the system by job displacement and the socio-economic system' ability to absorb it with job creation. The displacement is driven by the eruptive pace of digital technology's application to information and communication technology. Artificial intelligence's and tele-migration's (remote intelligence's) elimination of jobs. The replacement is driven by human ingenuity which moves at the leisurely pace it always has. The radical mismatch between the speed of job displacement and the speed of job replacement has been a perennial downside of technological transformations. In the age of hyper-intelligence, the disruptions are faster. Technology produces and economic transformation, the economic transformation produces and economic and social upheaval, the upheaval produces a backlash and backlash produces a resolution according to Richard Baldwin in THE GLOBOTICS UPHEAVAL: GLOBALIZATION, ROBOTICS, AND THE FUTURE OF WORK (Baldwin, 2019).

So far, the American data giants seem to have adopted the business model of ATTENTION MERCHANTS. They capture out attention by providing us with free information, services, and entertainment, and they then sell our attention to advertisers. The data giants seem to have far higher goals than any previous ATTENTION MERCHANTS. In 1920s, SIGMUND FREUD's nephew, EDWARD BERNAYS, realized that his uncle's psychotherapy opened up a new lucrative world of retail therapy by inventing the public relations industry. Despite being far richer than kings of old, we are too easily trapped on a treadmill of consumerism, continually searching for identity, connection and self-transformation through the things we buy. EDWARD BERNAYS's method of persuasion – tastefully named 'public relations' – transformed marketing worldwide and, over the course of the 20th century embedded consumer culture as a way of life. Drawing on his uncle's insights into the workings of the human mind his advertising firm convinced some women on behalf of the AMERICAN TOBACCO CORP. that cigarettes were their "Torches of Freedom" and reduced MARLBORO MAN's existentialist choice to "Good Taste or Good Tobacco".

These data giants' strategic goal is not to sell adverting, their tactical goal for now is. By capturing our attention, they manage to accumulate immense amounts of data about us, (how, when, where, why we behave) which is worth more than any advertising revenue. It is not accurate to think of GOOGLE's users as its customers. There is no economic exchange, no price, and no profit. Nor do users function in the role of workers. Users are not paid for their labor, nor do they operate the means of production. The user is not the product, but rather they are the sources of raw-material supply. GOOGLE's products are derived from data about users' behavior. Its products are about predicting users without caring what the users do or what is done to the users.

In the medium term, this data hoard opens path to a radically different business model whose victim will be the advertising industry itself. The strategic business model is based on transferring decision making from humans to algorithms, including the authority to choose and buy things. Once algorithms choose and buy things for us, the traditional advertising industry will be redundant. GOOGLE is aiming to reach a point where we can ask GOOGLE anything and get the "best answer" in the world.

In THE GREAT TRANSFORMATIOIN: THE POLITICAL AND ECONOMIC ORIGINS OF OUR LIVES (Polanyi, 1944, 1957), Karl Polanyi identified three transformations. First was branding human life as labor. Second was branding nature as real estate. Third was branding free exchanges of goods and services as money. The fourth, Shoshana Zuboff explains in THE AGE OF SURVEILLANCE CAPITALISM: THE FIGHT FOR A HUMAN FUTURE AT THE NEW FRONTIER OF POWER (Zuboff, 2019) is "as the emerging economic order that expropriates human experience as free raw material for hidden commercial practices of extraction, prediction, and sales that subordinate production of goods and services to a new architecture of behavioral modification." (Zuboff, 2019).

GOOGLE was the first in Silicon Valley to understand the concept of "behavioral surplus" in which human experience is subjugated to attention merchants' surveillance capitalism's market mechanisms and reborn as behavior. Everything one does and think on line has the potential to be monetized by platform tech firms. All human activity is potentially raw material to be commodified by the tech firms. "GOOGLE is to surveillance capitalism what the FORD MOTOR COMPANY and GENERAL MOTORS were to mass-production based MANAGERIAL CAPITALISM," Shoshana Zuboff wrote (Zuboff, 2019). Nearly everything we do can be mined by platform companies. But only if they can keep information free. That means keeping value of personal data opaque, ignoring copyrights on content by making it difficult to protect.

"Now, with the rise of the surveillance capitalism practiced by Big Tech, we ourselves are maximized for profit our personal data is, for Big Tech companies and others that harvest it, the main business input. …. You are the raw material used to make the product that sells you to advertisers." writes Rana Foroohar in HOW BIG TECH BETRAYED ITS FOUNDING PRINCIPLES AND ALL OF US: DON'T BE EVIL (Foroohar, 2019). "As in any transaction, the party that knows the most can make the smartest deal. The bottom line is that both big-platform tech players and large financial institutions sit at the center of an hourglass of information and commerce, taking a cut of whatever passes through. They are the house, and the house always wins" (Foroohar, 2019.) Companies that both create marketplaces or platforms, and then also do commerce within them have an unfair advantage.

TWITTER and FACEBOOK may look similar at first glance. Each is a social network connecting users online and presenting them with content in a "feed", a never-ending list of posts, pictures and videos of pets. Each employs every trick to glean data from users' behavior that enable advertisers to hit targets precisely for which advertisers pay to influence the decisions users are to make. Dipayan Ghosh in TERMS OF DISSERVICE: HOW SILICON VALLEY IS DESTRUCTIVE BY DESIGN (Brookings Institute, 2020)[1] illuminates the differences between the two social networks. TWITTER is essentially an internet "Speakers' Corner", where anyone can hold forth and others can talk back. It is "one-to-many" broadcast network. FACEBOOK is "one-to-one" or "one-to-few" network, replicating social relationships of the sort between friends, family or colleagues. The difference may seem subtle, but it has several implications for both firms' business.

FACEBOOK is able to gather more data about its users because they are more engaged with others. This makes it easier to target ads. FACEBOOK also benefits from stronger "network effects". Each additional subscriber makes the service more useful for others, which attracts more subscribers. TWITTER cannot rely on such a turbocharged engine of growth. Having friends is a social need, maintaining a soapbox is non-essential for most, even for some serious extroverts. In 2019 Facebook reported 9 times the users, 21 times the revenue

and 12 times the profit of TWITTER. Moreover, the strong network effects are a prime asset that FACEBOOK has defended vigorously. It has spent $1billion in acquiring INSTAGRAM in 2012, and $19billion for WHATS-APP in 2014. FACEBOOOK's size has made it the dominant outlet for political discourse outside of China.

One particular area of concern is how Big Tech firms use machines rather than human relationships to judge customers, as Cathy O'Neil exposes in WEAPONS OF MATH DESTRUCTION: HOW BIG DATA INCREASES INEQUALITY AND THREATENS DEMOCRACY (O'Neil, 2016, 2017) to hoover up online data by using opaque algorithms and use the data to create customer profiles and sell them " many of these models encoded human prejudice, misunderstanding and bias into the software systems that increasingly managed our lives. Like gods, these mathematical models were opaque, their workings invisible to all but the highest priests in their domain: mathematicians and computer scientists. Their verdicts, even when wrong or harmful, were beyond dispute or appeal. And they tended to punish the poor and the oppressed in our society, while making the rich richer." (O'neil, 2016) What you do online thus may end up affecting opportunities in your offline life.

In the longer term, by bringing together enough data and enough computing power, the data giants could hack the deepest secrets of life, and then use this knowledge not just to make choices for us or manipulate us but also to reengineer organic life and create inorganic life forms. Selling advertisements may be necessary to sustain the giants in the short term, but tech companies often evaluate apps, products, and other companies according to the data they harvest rather than according to the money they generate. The business model of a popular app may be a money loser, but as long as it sucks data, it could be worth billions. Cash rich tech firms have become the financial engineers of the 21st century. The rate of return analysis of corporate finance does not help much.

Tim Wu in THE MASTER SWITCH: THE RISE AND FALL OF INFORMATION EMPIRES (Wu 2011) suggest that to understand the forces threatening the INTERNET as we know it, we must understand how information technologies give rise to industries and industries to monolithic structures. As with any economic theory, there are no laboratories but past experience. Illuminating the past to anticipate the future is the raison d'etre of economic history, which is conspicuously absent in MBA programs mass-marketed by American universities. Understandably so, because history, many times, negates their neoclassical mantra.

Schumpeter had no patience for what he deemed Adam Smith's fantasy of price warfare, growth through undercutting your competitor and improving the market's overall efficiency thereby. "In capitalist reality as distinguished from its textbook picture, it is not that kind of competition which counts," argued Schumpeter, but rather "the competition from the new commodity, the new technology, the new source of supply; the new type of organization." Schumpeter's theory did not account for the power of law to stave off industrial death and arrest the creative destruction or help to speed up the destructive process by not regulating mergers and acquisitions. DIGITAL MILLENNIUM COPYRIGHT ACT Congress passed in 1998 gave companies that provided online services "safe harbor" immunity from copyright-infringement liability for their user's actions to protect e-commerce sites from being responsible what third-party actors are selling on their sites. "E-commerce represents about 10% of all US retail and AMAZON is by far the largest player, with an estimated share of 43%. In 1998 AMAZON accounted for 53% of all the incremental growth of online shopping, which means they are only growing their dominance. …. AMAZON's anticompetitive effect stems from its inherent conflict as both a direct seller and the operator of a platform that it invites other sellers to use. … According to UPSTREAM COMMERCE, AMAZON tracks third-party sales on its site and uses that data to sell the most popular items in direct competition with marketplace members. …. AMAZON has a clear conflict of interest when it comes to policing counterfeits and competing with its own partners. As a platform, it wants the maximum number of people selling on its site, much like FACEBOOK and GOOGLE want the maximum number of eyeballs to sell ads against. Whether that comes from pirated content or not, the tech giants simply don't care. … A recent study by ProPublica found that the company is using its market power and proprietary algorithm to advantage itself at the expense of sellers and many customers. When they searched for hundreds of items on the site, about three-quarters of the time, AMAZON put its own products above third-party products using its plat form, when competing products were cheaper. As a platform, it pays to be the regulator of your own marketplace." (Tepper and Hearn, 2019).

ALPHABET, GOOGLE's holding company, in 2018 was the second largest company in the world. Measured by market capitalization, APPLE was first. Joined by AMAZON, MICROSOFT and FACEBOOK, the five form an increasingly feared global oligopoly. "Between GOOGLE, AMAZON, APPLE, FACEBOOK, and MICROSOFT, they have collectively bought over 436 companies and startups in the past 10 years, and regulators have not challenged any of them. In 2017 alone, they spent over $31.6billion on acquisitions. Most small companies now do not expect to succeed on their own and their only goal is the 'exit' to one of the big tech companies before they are crushed." (Tepper and Hearn 2019).

In the 1970s, the microprocessor radically reduced the cost of computers. In the 1990s, OPEN SOURCE software started to dethrone WINDOWS, MICROSOFT's then dominant operating system. Richard M. Stallman of MIT's artıfıcıal ıntellıgence laboratory argued that software code was quickly becoming the language of communication between people, and people and things, and that it was immoral and unethical to enclose and privatize the new communications media, allowing few corporate players to determine the conditions of access while imposing rent. To keep software distributed, collaborative and free, Stallman assembled a consortium of programmers and erected an operating system called GNU made up of free software that could be accessed, used, and modified by anyone. In 1985 founded the free software foundatıon.

Gnu General Publıc Lıcense (GLP), unlike conventional copyrights that give the holder the right to prohibit others from reproducing, adopting, or distributing copies of an author's work, allow an author to give every person who receives a copy of a work permission to reproduce, adapt, or distribute it and require that any resulting copies or adaptations are also bound by the same licensing agreement. GPL became the vehicle for the establishment of free sharing of software.

Six years after Stallman's GNU operating system and the GPL, Linus Torvalds designed a free software kernel for a Unix-like operating system for personal computers that was compatible with Stallman's GNU project and distributed it under the FREE SOFTWARE FOUNDATION's GPL. The LINUX kernel made it possible for thousands around the world to collaborate via INTERNET on improving free software code. In 1998, Eric S. Raymond and Bruce Perens created OPEN SOURCE INITIATIVE, OSI, to dampen FREE SOFTWARE MOVEMENT's fear of commercial interests.

MICROSOFT might never have come to rule PC software had IBM, accused of monopolizing mainframes, not decided in 1969 to market computers and their programs separately, a move that created the software industry. GOOGLE might not have taken off in the way it did had MICROSOFT not agreed, at the end of its antitrust trials in America and Europe in the 2000s, not to discriminate against rival browsers and to license technical information which allows other operating systems to work easily with WINDOWS.

MICROSOFT's first operating system (MS-DOS) that MICROSOFT acquired from another firm, SEATTLE COMPUTER PRODUCTS, was actually a clone of CP/M, another operating system. MICROSOFT WINDOWS was a rip-off of the APPLE MACINTOSH operating system; MICROSOFT WORD and EXCEL were copies of WORDPERFECT and LOTUS 1-2-3 respectively. By late 1990s, MICROSOFT unleashed its predatory strategy against NETSCAPE. EXPLORER was MICROSOFT's copy of NAVIGATOR, and soon NAVIGATOR was nowhere EXPLORER was everywhere. In few short years NETSCAPE was bankrupt. As Brian McCullough detailed in HOW INTERNET HAPPENED: FROM NETSCAPE TO THE IPHONE(McCullough 2018)[1]. With minimal antitrust enforcement, MICROSOFT would have been in a perfect position to control the future of internet, had Department of Justice not decided to prosecute the last big antitrust case of the 20th century.

MICROSOFT was built as technological walled garden. On April 21, 2020, however, it announced its plans to launch 20 data-sharing groups by 2022 and give away some of its digital information, including data it has gathered on COVID-19. The OECD recons that if data were more widely exchanged, many countries could enjoy gains worth 1-2.5% of GDP. The estimate is based on heroic assumption on opportunities for start-ups. But most agree that readier access to data is broadly beneficial, because data are non-rivalling. Unlike oil, they can be used and re-used without being depleted to power various artificial-intelligence algorithms at once. MICROSOFT, besides encouraging non-commercial sharing, is developing software, licenses and rules frameworks to let firms trade data or provide access without losing control. Optimists believe that Mıcrosoft's move could be to data what IBM's embrace of Lınux operating system was to open-source software in 1990s. Linux went

on to become a rival to MICROSOFT' WINDOWS and today underpins GOOGLE's ANDROID mobile software and much of cloud-computing.

Fewer than 100 firms collect more than half of all data generated on line. More sharing would counteract concentration. Data are more complex than code. Most programmers speak the same language and open-source collectives mainly solve technical problems. People in charge of data often come from different industries without a common vocabulary. Unlike ALPHABET and FACEBOOK that extract value from hoarded data through targeted advertising, MICROSOFT makes most of its money by selling services and software to help others process digital information. The more data shared the better for MICROSOFT.

FIREFOX, a web browser made by the non-profit MOZILLA FOUNDATION, was born as 'phoenix'. It rose from the ashes of NETSCAPE NAVIGATOR, slain by MICROSOFT's INTERNET EXPLORER. In 2012, MOZILLA created FIREFOX OS, to rival APPLE's IOS and GOOGLE's ANDROID mobile operating systems. MOZILLA began life in 1998 after the "browser war" between MICROSOFT's INTERNET EXPLORER and NETSCAPE's NAVIGATOR. Even though the fight got MICROSOFT into deep trouble with completion regulators, which nearly broke it up, NETSCAPE had to capitulate. But released the NAVIGATOR's source code so that an alliance of volunteer developers could keep the browser alive. Even compared with other OPEN-SOURCE projects, MOZILLA is an unusual hybrid. It boasts a volunteer workforce of nearly 23,000 that contributes about half of the company's code in exchange for little more than recognition from their peers and the satisfaction of chipping in to a project they believe in. It is two organizations in one; the MOZILLA FOUNDATION and the MOZILLA CORPORATION that has 1,100 employees on payroll. The first is a charity which owns the second and makes sure that it does not stray away from its mission. The corporate arm is in charge of products and gets the cash that search engines pay for appearing on FIREFOX's start page. Together GOOGLE, BAIDU and YANDEX and a host of others paid $542million for the traffic they got from FIREFOX in 2017.

MOZILLA has shown that open-source approach can work in consumer software. FIREFOX was the first browser to block-up ads and allow users to surf anonymously, promoting commercial browsers to offer similar features.

Unable to compete, MOZILLA killed the ill-fated mobile operating system project. Another 'phoenix' has arisen from it. KAIOS, an operating system conjured from the defunct software, powered 30million devices in 2017 and another 50millioin in 2018. Most were simple flip-phones sold in the West for about $80 a piece, or even simpler ones which Indians and Indonesians can have for as little as $20 or $7, respectively. KAIOS, based in Hong Kong, designed the software for smart-ish phones with old-fashioned number pad and long battery life, plus 4G connectivity, popular apps like FACEBOOK and features like contactless payments without snazzy touchscreens. GOOGLE invested $22million in KAIOS in 2018. Even if KAIOS powers another 70million devices in 2019, as the company expects in 2019, that would barely be one tenth of the 1.5billion APPLE and ANDROID phones sold annually.

A decade ago American firms took an early lead in 4G setting standards for new handsets and applications that spread word-wide. That dominance helped APPLE, GOOGLE, and other American businesses generating billions of dollars in revenues. China learned its lessons, investing $180billion to deploy 5G networks over the next 5 years and assigning swathes of wireless spectrum to three state providers. In America the same part of the spectrum is largely off-limits commercially because it is used by the federal government. American firms are experimenting with different parts of the spectrum that has some advantages under laboratory conditions but easily blocked by buildings and trees.

The potential consequences of the market power held by the new technology giants are greater and more pernicious than anything seen at the turn of the 20th century. Then the market power of companies like SWIFT, STANDARD OIL, AMERICAN TOBACCO, The AMERICAN SUGAR REFINING COMPANY, or US STEEL allowed them to raise the price they charged for food, steel, tobacco, sugar and oil. Now, it is about more than just the price.

The equivalent course of action now is to force today's giants to open up their data vaults, thus lowering the barriers to entry and giving newcomers a better chance to compete. Now it is the turn of data. Today online applications bundle user interface, code and data. FACEBOOK, for example, is known for its website and app, but both are just the tip of a virtual iceberg. Most of the software and all the information that keep social network going live in the firm's CLOUD. Controlling those data gives these companies power. Users are free to move to another service, but they would lose all that information, including the links to their friends.

European Commıssıon fined GOOGLE 4.3billion Euros on 7/18/2018 and ordered to GOOGLE to stop emulating the 1990s MICROSOFT's product strategy. To assure its market lead, instead of giving the buyers the option to choose, Mıcrosoft bundled several software in tie-in contracts and offered the bundle to the buyers. Google's case involved its mobile operating system, ANDROID, and bundled related software and services, such as Google Play, its app store, Internet search and several other apps. Google, in practice, gives smart phone makers and telecoms operators an all or, nothing choice as MICROSOFT did in the 1990s. If, the makers want to install any of these programs on their devices, they have to install them all and show their icons in prominent positions. Since firms need at least the app store to make their products commercially viable, they have no choice but to comply. Furthermore, GOOGLE does not allow the phone manufacturers to install competing versions of ANDROID on any of their models.

By contrast, in WEB 3.0 interface, code and data are meant to be kept separate. This would allow power to flow back to users, who would decide which application can access their information. If they were not happy with one social network, they could easily switch to another. With such decentralized applications, (DAPPs), users could also interact directly with other users without an information-hoarding intermediary in the middle. Similar ideas have been tossed around. Decentralized services, then called "peer-to-peer" briefly flourished in the late 1990s and 2000s. They fizzed out mainly because a robust decentralized database did not exist.

Combining database and network technologies, BLOCKCHAIN is a digital peer-to-peer decentralized platform for tracking all kinds of value exchanged between people. Its name derives from the blocks of data, each one a snapshot of all transactions that have just been made in the network, which are linked together to create a chain of data blocks, adding up to a minute-by-minute record of the network's activity. Since, that record is stored on every computer in the network, it acts as a public ledger that cannot be altered, corrupted or deleted, making it a highly secure digital backbone for the future of e-commerce and transparent governance.

With the invention of Blockchaın, a ledger without a centralized administrator maintained collectively by some of its users, called "miners", who also protect the Blockchaın and keep others in check a robust decentralized system is feasible. The Blockchaın is a specialized database in the form of an immutable record of the transaction history, a digital babylonıan tablets. Most WEB 3.0 projects comes with smart contracts, snippets of code that encapsulate business rules which are automatically executed if certain events occur. The advanced projects focus on building the software infrastructure needed for DAPPS. Blockstack, arguably very ambitious, is seen as an operating system for such applications.

One digital currency that uses Blockchaın technology is Ethereum, which among its possible applications, is enabling electricity micro-grids to set up peer-to-peer trading in renewable energy. These micro-grids allow every nearby home, office or institution with a smart meter, ınternet connectıon, and solar panel on its roof to hook in and sell or buy surplus electrons as they are generated, all automatically recorded in units of the digital currency. Such decentralized networks, ranging from a neighborhood block to a whole city, build community resilience against blackouts and cut long-distance energy transmission losses at the same time.

The landscape of Chinese FinTech is dominated by two players: ANT fıancıal of alıbaba, and tencent, best known for WeChat, its social media network. ANT was estimated to be worth $150billion in 2017, a little less than HSBS. Both firms got their start in payments. ANT FINANCIAL stems from ALIPAY created in 2004, TENPAY was launched in 2005 for QQ, TENCENT's online-messaging platform, and was later grafted into WeChat. Both have boomed by linking mobile apps with offline payments. Almost all merchants in China provide QR codes to be scanned by phone in order to pay. In 2017, ALIPAY had 54% of the mobile-payment market. It worked with more than 250 financial firms outside of China so that Chinese tourists can use it.

Ant and Tencent are more interested in hooking users on other financial services than in payments alone. Once a user is on their platforms, mutual funds, insurance products, and virtual credit cards are accessible with a tap of a finger on smart phone. The duo's move into retail banking with TENCENT's WeBank and ANT's MYbank increased regulator's concerns for money-laundering, but also protecting the banks from FinTech's competition.

The control structures built to ensure the ironclad hold of the founders of corporations are referred as "Key man risk", and is a big point of contention in China and abroad. China does not allow foreign entities to own sensitive assets, such as government licenses needed. These licenses are owned by Chinese individuals, often including the founders, are bundled into VARIABLE INTEREST ENTITIES. In addition, the Chinese companies listed in America have "dual class" stock structure which allows founders to own a special class of stocks with superior voting rights. JD.com, for example, ALIBABA's rival in e-commerce, has the ratio set at one share to 20 votes, enabling Richard Liu, the founder of JD.com, to control 80% of JD.com voting rights by owning less than 20% of the stock. JD.com has not convened an annual stockholders' meeting since its floatation in 2014 which is allowed under corporate governance laws of Cayman Islands where it is incorporated as most global Chinese tech champions are. Cayman Islands, one of Britain's Caribbean territories, seem to be the most favored location to incorporate for Chinese companies set to list in New York. BAIDU, for example, listed in America in 2005, and to list it incorporated in Cayman Islands, but has not held a stockholder's meeting since 2008. TENCENT of BAT is different. It has VARIABLE INTEREST ENTITIES, but one-stock-one-vote, and listed in Hong Kong in 2004.

Another first of GOOGLE in Silicon Valley was to introduce a dual-class share structure with its 2004 public offering. The two founders, PAGE and BRIN, would control the super-class B voting stock, shares that each carried 10 votes, as compared to the A class of shares, which each carried only 1 vote. The arrangement inoculated Page and Brin from market and investor pressures. Subsequently, the founders imposed a tri-share structure adding a C class of zero voting rights stock. By 2017, Brin and Page controlled 83% of the super-voting-class of B shares, which translated into 51% of the voting power.

When GOOGLE's leads, many Silicon Valley founders follow. By 2015, 15% of IPOs were introduced with dual-class structure, compared to 1% in 2005. In 2012 FACEBOOK's IPO with a two-tiered stock structure left Mark Zuckerberg in control of voting rights. The company then issued nonvoting class C shares in 2016, solidifying Zuckerberg's personal control over decisions. While the consequences of these share structures are being debated, absolute corporate control enabled the founders of GOOGLE and FACEBOOK to aggressively pursue acquisitions of start-ups in facial recognition, deep learning, augmented reality and more.

Brin and Page at GOOGLE who do not enjoy the legitimacy of the vote, democratic oversight, or the demands of shareholder governance exercise control over their organization and presentation of the world's information, but neither do BAIDU's and ALIBABA's CEOs. Zuckerberg at FACEBOOK who does not enjoy the legitimacy of the vote, democratic oversight, or the demands of shareholder governance exercise control over an increasingly universal means of social connection along with the information concealed in its networks. So does Jack Ma.

Jack Ma, a founder of ALIBABA is a member of the Chinese Communist Party, and indirectly owns four of its five VARIABLE INTEREST ENTITIES with one of his co-founders. In 2019, when Jack Ma steps down as chairman, as he said he would, all VARIABLE INTEREST ENTITIES will be transferred to two layers of holding companies, in turn owned by a broad set of ALIBABA's senior Chinese staff. Jack Ma will remain a lifetime member of the ALIBABA Partnership, which concentrates control of the company in a club of 36 senior staff. ALIBABA Partnership is empowered to appoint majority of board seats. Thus, Jack Ma will keep to have an influential role in the company's culture and ecosystem. This succession plan will unite ALIBABA's, CHAIRMAN and CEO, under Daniel Zhang. He has been an adroit CEO for ALIBABA since 2015. The succession plans of the founders of the Chinese tech firms who are now in their 40s and 50s, is expected to develop new challenges for global corporate governance in the next decade.

5. How to fit a fast changing world into a static theory

In 2017 the UK's ECONOMIC AND SOCIAL RESEARCH COUNCIL have let it be known that it was setting up a network of experts from different disciplines including psychology, anthropology, sociology, neuro-science, economic history, political science, biology and physics whose task it would be to revolutionize the field of economics. Eric D. Beinhocker in the orıgın of wealth: evolutıon, complexıty and the radıcal remakıng of economıcs (Beinhocker 2007) makes the reasons for this spirit of revolutionary zeal apparent enough. While both biological and economic systems share the core algorithm of evolution – differentiate, select, and amplify – and thus have similarities. Their realizations of evolution are in fact different and must be understood in their individual contexts. Director of the center for cognıtıve studıes, daniel dennett in darwın's dangerous ıdea: evolutıon and the meanıng of lıfe (Dennett, 1995) presents evolution as a general purpose algorithm for creating 'designs without a designer'.

"Mainstream economics believes social phenomena are best understood as the summed-up behavior of individuals, an approach known as methodological individualism. This method has two characteristics: the only actors or agents recognized on the economists' social map are persons (this 'realistically' includes households and small firms, but not organizations and classes), and individual choices and decisions are independent, that is, specific to those making them. This two-fold claim enables economists to use a simple additive formula to demonstrate that aggregate outcomes are the result of an enormous number of discretionary decisions by individual actors. With the further assumption that individual plans are, on average, fulfilled – that is, there is no uncertainty – one can derive an aggregate number by adding up the individual plans. There are two huge flaws in the approach which represents individual choices as parallel straight lines. The first is that explanations in terms of individuals alone omit the relations between them, and thus the social structure in which choices are made. Individuals are part of 'networks' of choice. So, aggregate outcomes of any kind are the sum of individual choices plus the social structure. The second flaw is summed up in the phrase 'the fallacy of composition'. Even if made independently, individual choices affect each other. For mainstream economists it is not enough simply to specify individual persons as the sole choosing unit. Their units choose 'rationally'. They have coherent plans; act purposively to achieve them; and calculate the most efficient means to get what they want. Mainstream economics presents us one human type – Economic Man or homo economicus, the human calculating machine, continually calculating how to get the most ('maximum') gain he can for the least cost. This calculation is done in prices, everyone and everything has a price. …. Economists reduce social structures to economic transactions and erect one aspect of human behavior, calculation of costs ('how much will it cost me to do X rather than Y?), into a universal law of all human behavior." (Robert Skidelsky, 2020).

"The economic collapse of 2008 represents a major failure for the profession of economics. Not only did economists fail to see the onslaught coming, but once the crisis arose, they had no idea how to deal with it. Part of this failure can be traced to the reductionist desire to break things down to simple parts. In the language of modern economic theory, this led to the reliance on 'representative agents', constructs that attempt to capture the behavior of, say, all consumers using a single mega-consumer. In part, such a choice arises from the fourteenth-century friar Father William of Ockham's dictate to prefer simpler explanations to more complicated ones. … In reality, the use of representative agents is also driven by the limitations of modeling tools typically used by economists, as these tools can be deployed only if there is a high degree of homogeneity in the system. While homogeneity is a useful assumption – for both philosophical and practical reasons – the study of complex systems suggests that the behavior of heterogeneous systems may not be so easily averaged out. … Complex systems often have some inherent degree of randomness tied to the behavior of the agents or the structure of interactions. … Indeed, a key dictate in modern business management is to seek quality by removing all sources of randomness from any process. … The study of complexity suggests otherwise. Randomness is fundamental to Darwin's theory of evolution, which relies on the notion that errors (variations) during reproduction will provide grist for the mill of selection and result in 'endless forms most beautiful and most wonderful'." reminds us John H. Miller in A CRUDE LOOK AT THE WHOLE: THE SCIENCE OF COMPLEX SYSTEMS IN BUSINESS, LIFE, AND THE SOCIETY (Miller, 2015).

The notion that the economy is an evolutionary system is a radical idea because it directly contradicts the mainstream paradigm of economics that portrayed the economy as a system that moves from equilibrium point to equilibrium point over time, propelled along by external shocks from technology, politics, changes in consumer tastes, and other external factors. But it is far from a new idea. Michael Strevens in the knowledge machıne: how ırratıonalıty created moden scıence reminds us: "Thomas Kuhn believed that when scientists make the jump from an old to a new paradigm, they tend to jump from a less to a more predictive paradigm, though they are incapable, as they launch themselves, of appreciating the underlying reasons for the new

paradigm's superior future predicting potential. But science itself, Kuhn believed, is supreme among belief systems in its ability to create new knowledge. What is unparalleled is its ability to test those ideas thoroughly, to drive them to their logical or illogical conclusions. Central to science's extraordinary rigor is precisely the limitedness of the individual scientists, their inability to see outside the prevailing paradigm."(Strevens, 2020).

Richard Nelson's and Sidney Winter's AN EVOLUTIONARY THEORY OF ECONOMIC CHANGE (The President and Fellows of Harvard College 1982)[1] was an early attempt to marry evolutionary theory to economics, and the recently developed tool of computer simulation. J. Stanley Metcalfe in EVOLUTIONARY ECONOMICS AND CREATIVE DESTRUCTION (The Graz Schumpeter Society, 1988)[1] integrates many of the relevant themes into a formal analytical treatment based around Fisher's Principle, a central theme in his evolutionary theory; namely that variety drives change. "What makes capitalism distinctive is the decentralized and distributed capacity for introducing new patterns of behavior; whether they be technological, organizational or social, they are the fuel which drives economic change" (The Graz Schumpeter Society, 1998). "Modern capitalism presents us with a paradox. The individual acts of creativity on which its mechanisms of change depend are remarkable for their lack of co-ordination. Yet the consequences of this immense micro creativity depend deeply upon the strong co-ordination of the fruits of that creativity by market processes. The joining together of the uncoordinated striving for innovation with the subsequent market co-ordination of the resulting activities is the distinctive feature of the capitalist mode of change." (The Graz Schumpeter Society, 1998).

Substrate-neutral algorithmic theory, with John H. Holland's landmarks ADAPTATION IN NATURAL AND ARTIFICAL SYSTEMS: AN INTRODUCTORY ANALYSIS WITH APPLICATIONS TO BIOLOGY, CONTROL AND ARTIFICIAL INTELLIGENCE (Holland, 1992)[1], and HIDDEN ORDER: HOW ADAPTATION BUILDS COMPLEXITY (Holland, 1995)[1], and SIGNALS AND BOUNDARIES: BUILDING BLOCKS FOR COMPLEX ADAPTIVE SYSTEMS (The MIT Press, 2014)[1]; John Maynard Smith's EVOLUTION AND THE THEORY OF GAMES (Smith, 1982)[1], and Stuart Kauffman's ORIGINS OF ORDER: SELF ORGANIZATION AND SELECTION IN EVOLUTION (Kauffman, 1993)[1] provided germ seeds that have flourished COMPLEXITY ECONOMICS that views the economic system as a complex adaptive system as W. Brian Arthur of SANTA FE INSTITUTE summarizes in COMPLEXITY AND THE ECONOMY (Arthur, 2015)[1]. Theoretical physicist Geoffrey West of SANTA FE INSTITUTE, a pioneer in the fields of complexity science, in SCALE: THE UNIVERSAL LAWS OF GROWTH, INNOVATION, SUSTAINABILITY, AND THE PACE OF LIFE IN ORGANISMS, CITIES, ECONOMIES, AND COMPANIES (West, 2017)[1] sums up decades of his inquiries into universal laws of scaling, not only of organisms but also cities, economies, and companies, to discern common patterns and to offer his vision of a grand unified theory of sustainability by explaining why some companies thrive while others fail, why the rate of innovation continues and why this dynamic threatens global sustainability.

Almost half a century ago, in THE ENTROPHY LAW AND THE ECONOMIC PROCESS (Georgescu-Roegen, 1971) Nicholas Georgescu-Roegen's basic insight was that economic activity is fundamentally about order creation, and that evolution is the mechanism by which that order is created. He argued that while the biological form of the human species continues to evolve slowly, or 'endosomatically', through our genes, we are at the same time rapidly evolving 'exosomatically' through our culture. Georgescu-Roegen was not the first to make this observation. Darwin saw this as an implication of his theory, and 1960s Pierre Teilhard de Chardin in THE FUTURE OF MAN[1] developed a philosophy based on the idea of endosomatic and exosomatic evolution. Nor was Georgescu-Roegen was the only economist looking to cultural evolution for answers.

Georgescu-Roegen argued that the idea of continuous economic growth, implicit in neoclassical economics, had the same problem as a perpetual motion machine. It violates basic laws of physics. In fact, the entire mechanistic analogy was wrong. "Anyone who believes that he can draw a blueprint for the ecological salvation of the human species does not understand the law of evolution or even history – which is that of permanent struggle in continuously novel forms, not that of a predictable, controllable physico-chemical process, such as boiling an egg or launching a rocket to the moon." (Georgescu-Roegen, 1971). Neoclassical economic theory does not view production as physical transformation subject to biophysical limits and laws of thermodynamics. Also it shows that the force of resource scarcity is in the nature of a limiting factor, and not so easy to escape by substitution of capital for resources, as often claimed by neoclassical growth economists. He argued, but the most designers of very expensive MBA programs and their cheaper copycats ignored, particularly after they became the mass marketers of stockholder wealth maximizing American corporations, ASSET MANAGER CAPITALISM.

Friedrich Von Hayek wrote about cultural evolution in The Constıtutıon Of Lıberty and Kenneth E. Boulding presented his theory in Ecodynamıcs: a new theory of socıetal evolutıon. It was Georgescu-Roegen, though who grounded his theory in science, in particular the connection between evolution and the second law of thermodynamıcs, the principle that the universe is inevitably moving from a state of low entropy to a state of high entropy. Economic systems exist in the real physical world, therefore, they must obey the same law of entropy as everything else in the universe does, was his argument. The economy is a subsystem of the Earth. The economy would have to conform to the behavior mode of the Earth. If, the economy is to take over the management of the entire ecosystem – every amoeba, every molecule, and every proton would then be allocated according to human purposes and priced accordingly. All 'externalities' would then be internalized, and nothing could any longer be external to the all-encompassing economy. All relationships in biosphere would be internalized into monetary accounts of the economy.

As the micro units of the economy – the firms, the households – operate as part of a larger system – the aggregate, the macro-economy – so does the aggregate economy operate as a part of a larger system, the natural ecosystem, The Earth. The macro-economy is an open subsystem of the ecosystem, GAIA, and is actually dependent upon GAIA, both as a source for inputs of low-entropy matter-energy and as a sink for outputs of high-entropy matter-energy. The physical exchanges crossing the boundary between system and subsystem constitute the subject matter of environmental economics. These flows need to be considered in terms of their scale or total volume relative to the ecosystem, not in terms of the price of one component of the total flow relative to another.

Economics is the problem of applying scarce means to attain as many ordered values as possible within physical limits, but with care not to waste resources by satisfying lower values to the neglect of higher values. Scarcity is imposed by our environment, which is finite, non-growing., and materially closed, though open to a fixed rate of flow of solar energy. It is also subject to the laws of thermodynamics. The big ethical-economic problem is to apply our limited ultimate means to serve a hierarchy of ends ordered with reference to the ultimate end. Our ultimate means are low-entropy matter-energy – that which is required to satisfy our wants, but which we cannot produce in net terms but only use up. We have two fundamentally different sources of low entropy: the solar flow, and the terrestrial stock. They differ in their pattern of scarcity. The solar is flow-limited but stock-abundant, the terrestrial is stock-limited but temporarily flow-abundant. We can use up scarce terrestrial low entropy at a rate of our own choosing, in effect using tomorrow's fossil fuels today. But, we must wait for tomorrow to receive tomorrow's energy from the sun. We cannot 'mine' the sun. The ethical questions of balancing of interests between present and future generations in distributing terrestrial resources and massive transfers of inter-generational knowledge.

Economic definition of value had to take into account not just human labor or ownership, but also natural capital. According to Georgescu-Roegen's protégé Herman Daly, much of what is called economic growth had already become uneconomic, once loss of natural capital was taken into account. The solution was to aim for what John Stuart Mill had called a STEADY-STATE ECONOMY, one that would keep economic activity with ecological limits, conserve resources for future generations, and focus on qualitative improvements instead of aggregate growth in size, Herman Daly argued in FROM uneconomıc growth to steady-state ECONOMY (Daly, 2014). He defined STEADY-STATE "by constant stocks of people and physical wealth (artifacts) maintained at some chosen desirable level by a low rate of throughput. The throughput flow begins with depletion (followed by production and consumption) and ends with an equal amount of waste effluent or pollution. The throughput is the maintenance cost of the stock and should be minimized for any given stock size, subject to some limits stemming from the legitimate need for novelty." (Daly, 2014). "The laws of thermodynamics provide a theoretical limit to the improvement of maintenance activity." (Daly, 2014). "Environmental economics, as it is taught in universities and practices in

economics. The theoretical focus is on prices, and the big issue is how to internalize extended environmental crisis so as to arrive at prices that reflect full social marginal opportunity costs. Once prices are right the environmental problem is 'solved'- there is no macroeconomic dimension. The reason is that environmental macroeconomics is an empty box lies in what Thomas Kuhn calls a 'paradigm'. And what Joseph Schumpeter more descriptively called 'pre-analysis vision'. … One might say that vision is what the 'right brain' supplies to the 'left brain' for analysis. Whatever is omitted from the pre-analytic vision cannot be recaptured by subsequent analysis". (Daly, 2014). To control use of non-renewable resources like oil, in 1973 Herman Daly proposed a cap-auction-trade system. The government would cap resource extraction, and sell the extraction rights to the highest bidder. It could thus control the rate at which sources are consumed. A STEADY-STATE ECONOMY had to be organized according to different principles than a growth economy. Free trade would only encourage a "race to the bottom" in environmental standards since capital is almost globally mobile and labor is not with visa enclosures. "It is striking to note how little Europe's successful military strategies and institutions in the eighteenth and nineteenth centuries resembled the virtuous institutions that Adam Smith recommended in The Wealth Of Natıons (1776). In that foundational text of economic liberalism, Smith advised governments to adhere to low taxes and balanced budgets (with little or no public debt), absolute respect for property rights, and markets for labor and goods as integrated and competitive as possible. In all these respects, … Chinese institutions in the eighteen century were far more Smithian than United Kingdom's. In particular, China's markets were much more integrated. The grain market operated over a much broader geographic area, and labor mobility was significantly greater. … Taxes were much lower in China: barely 1-2% of national income compared with 6-8% in Europe in the late eighteenth century. The Qing dynasty enforced strict budget orthodoxy.: taxes paid for all expenses, and there was no deficit. By contrast, European states accumulated significant public debt despite their higher taxes." Thomas Piketty remind us in Capıtal And Ideology (The President and Fellows of Harvard College, 2020).

Alexander Wendt in quantum mınd and socıal scıence: unıfyıng physıcal and socıal ontology (Wendt 2015) by proposing the thesis that human beings are walking wave functions, purports to describe social reality to be emergent in a quantum sense and portrays social life to be quantum mechanical and challenge the atomistic, deterministic, mechanist and objectivist classical world view. By proposing that consciousness is a macroscopic quantum mechanical phenomenon, unlike materialistic, atomistic, deterministic, mechanistic worldview of Homo Economıcus with its absolute space and time and the subject-object distinction, the Alexander Wendt's quantum consciousness hypothesis raises the issue of consciousness and its relationship to the physical world. All intentional phenomena, according to Alexander Wendt are quantum mechanical, including private thoughts and public or collective intentions like norms, culture and language.

Alexander Wendt's "Quantum Man is physical but not wholly material, conscious, in superposed rather than well-defined states, subject to and also a source of non-local causation, free, purposeful, and very much alive. In short, she is a subject rather than an object, and less an agent than an agency, someone always in a state of becoming. Moreover, this agency is a process in and through which she is sovereign. She decides her present by how she collapses her wave function; she decides her future by projecting herself forward in time and enforcing correlations backwards, and to some extent she even decides her past, by adding to or replacing it in her particles." (Wendt, 2015).

Jerome R. Busemeyer and Peter D. Bruza in quantum models of cognıtıon and decısıon (Busemeyer and Bruza, 2012) claim that mathematical structures from quantum theory provide a better account of human thinking than traditional models, and introduce the foundations of modelling probabilistic-dynamic systems using two aspects of quantum theory. "Contextuality" to understand inference effects found with inferences and decisions made under uncertain conditions. "Quantum entanglement" to model cognitive phenomena in non-reductionist ways. They portray human decisions in a new light by employing these two quantum theory constructs by exploring the application of the probabilistic dynamic system created by quantum theory to the field of cognition and decision making. Traditional modelling in cognitive and decision sciences relied on classical probabilistic dynamic systems. Quantum theory allows them to model the cognitive system as if it was a wave moving across time over the state space until a decision is made. Once a decision is reached, and uncertainty resolved, the state becomes definitive as if the wave collapses to a point like a particle. They "argue that the wave nature of an indefinite state captures the psychological experience of conflict, ambiguity, confusion, and uncertainty; the particle nature of a definitive state captures the psychological experience of conflict resolution, decision, and certainty."(Busemeyer and Bruza, 2014).

David Orrell's QUANTUM ECONOMICS: THE NEW SCIENCE OF MONEY (Orrell, 2018)[1]offers an alternative to the orthodox neoclassical economic theory. In mathematical finance, quantum physics-inspired methodology "offers some computational advantages over usual statistical approach, but also changes the way one thinks about financial system, from being a mechanistic system with additional randomness, to a world of overlapping alternative possibilities, in which uncertainty is intrinsic to the system rather than an extra added feature. The emerging fields of quantum cognition and quantum social science, meanwhile, take a broader inspiration from quantum mechanics to think about how human beings make decisions and interact with one another." (Orrell, 2018).

Philip Mirowski in MORE HEAT THAN LIGHT: ECONOMIC AS SOCIAL PHYSICS AND PHYSICS AS NATURE'S ECONOMICS[1] (1989) portrays the progenitors of neoclassical economics trained as engineers with shallow and superficial grasp of physics who insisted that economics must become a mathematical science in order to instill some discipline and clarity of thought. "The overall thrust of the emulation of physics by economics was to discover the hidden fundamental natural determinants of value that lay behind the veil of everyday phenomena of money prices and incomes."(Mirowski, 1989) Later in the 20th century, "many economists who did not know that neoclassicism was reprocessed physics felt that they could assume that money and/or income possessed a constant marginal utility (Marshal 1920). Little did they realize that they were simply completing the original physical metaphor by imposing the conservation of energy through the condition that money and utility were identical." (Mirowski, 1989).

David Orrell adds "neoclassical economics is based on a NEWTONIAN picture of the economy as a mechanistic system, made up of self-interested atomistic individuals who interact only by exchanging goods and services and move the markets to a stable equilibrium thus viewing price changes as random perturbations. Money has no important role and acts primarily as an inert medium of exchange."(Orrell, 2018, p.99) For the past 150 years, neoclassical economics has clung to a number of assumptions that were mostly at odds with reality. Such as the idea that the economy is a self-stabilizing machine that maximizes utility composed of atomistic units like independent NEWTONIAN particles that can be understood and predicted using deterministic laws, and the idea of rational economic man, HOMO ECONOMICUS, the atomistic unit which forms the core of neoclassical models. "Economic agents were viewed as particles, while marginal utility or disutility for a particular commodity defined as satisfaction gained from consuming one more unit or more unit of it was viewed as a force acting in a kind of commodity space." (Orrell, 2018).

"A property of NEWTONIAN dynamics is that it can be expressed mathematically as a kind of optimization problem. Objects moving in a field take the path of least action, where 'action' represents a form of energy expenditure. Following the same script, neoclassical economists assumed that in the economy, individuals act to optimize their own utility by spending their limited resources. Economists could then make NEWTONIAN calculations about how prices would be set in a market economy, to arrive at what WILLIAM STANLEY JEVONS called a "mechanics of self-interest and utility" (Orrell, 2018). David Orrell clarifies the epistemic constraints of the model in explaining economic phenomena.

In MACHINE DREAMS: ECONOMICS BECOMES A CYBORG SCIENCE (Mirowski, 2002), Philip Mirowski discusses John Von Neumann's use of "Brouwer fixed-point theorem in economics explicitly in the context of a nonconstructive proof: basically , he showed the negation of his theorem would lead to a contradiction." (Mirowski, 2002) in his 1937 expanding economy model. In THEORY OF GAMES AND ECONOMIC BEHAVIOR (1944)[1], he changed his mind about usefulness of mathematics. "By the 1950s, at least for von Neumann, the fixed-point theorem had been downgraded in significance in favor of constructive proofs for what he considered to be central theorems of game theory. The contrast in THEORY OF GAMES AND ECONOMIC BEHAVIOR section 17.8 between the "indirect" and "direct" methods of proof of the minimax later became for von Neumann one of the main reasons to privilege the minimax over solutions such as Nash' equilibrium point: it was susceptible to constructive proof, whereas the Nash equilibrium was not." (Mirowski, 2002).

"It may also contribute to an explanation of von Neumann's disdain for Nash's solution concept as "trivial": after all, he had deployed the Brouwer theorem in economics more than a decade before and had subsequently decided that it was dead end" (Mirowski, 2002).

One area where HOMO ECONOMICUS played a conspicuous role "was the field of JOHN VON NEUMANN's game theory. … A key technique in game theory was BROUWER's FIXED-POINT THEOREM, which is a method for demonstrating that a system of equations, in this case representing the possible outcomes of a game, has a stable and optimal solution. GAME THEORY was initially developed for economics, but came into its own in developing the doctrine of MUTUALLY ASSURED DESTRUCTION (MAD)" (Orrell, 2018). during COLD WAR. According to MAD, rational actors can achieve a stable equilibrium if both know that starting a war will lead to instant annihilation of both sides. It is also used as an explanation of PEOPLE'S BANK OF CHINA's accumulation of high dollar reserves in 21st century. Though, the doctrine of MAD did not prevent President Trump from declaring trade wars to implement his selective protectionism.

"Whereas neoclassical economics had a lineage rooted in mechanics and therefore constructive models, the lesson derived by Arrow, Debreu, and Nash from Bourbaki was that questions of existence of equilibrium were really just demonstrations of the logical consistency of the model: there was no pressing commitment to models as a calculative device that mimicked reality. They all …. embraced fixed-point theorems … as defining their essence of equilibrium, to the neglect of whether and how it came about. In this sense they did finally cut themselves free from their origins in classical mechanics, which may go some distance in explaining how, in their own estimation, the history of their own economic tradition ceased to matter for their project.", claims Philip Mirowski. (Mirowski, 2002).

HOMO ECONOMICUS also played a role in Kenneth Arrow and Gerard Debreu's "proof that, again involved BROUWER's FIXED-POINT THEOREM, showed based on a highly idealized version of market economy, that free markets lead to an optimal 'fixed point', in which prices are set at their correct levels, and nothing can be changed without making at least one person worse off, a condition known as PARETO OPTIMALITY. But to accomplish this feat, the powers of HOMO ECONOMICUS had to be extended to include infinite computational power and the ability to devise plans for every future eventuality. The ARROW-DEBREU model seemed to provide mathematical proof of Adam Smith's invisible hand, Smith's theory that free markets are inherently self-stabilizing and set prices to their optimal levels" (Orrell, 2018).

Arrow and Debreu "imagined a hypothetical grand auction held at the beginning of time in which bids are made for every possible good and service that people might want to buy or sell at all possible future dates. The process continues until every market has cleared (that is demand equals supply) with prices, demands and supplies of all goods and services determined in the auction. Life then starts and time unfolds. Because the auction at the beginning of time has done its job, no market needs to reopen in the future. There are, therefore, no further transactions once life starts. Everything has been settled during the initial auction, and all people have to do is to deliver the services, such as employment, for which they have contracted and take delivery of the goods and services that they purchased in the auction. There is no need for something called money to act as either a medium of exchange (the 'double coincidence of wants' problem is circumvented by the auction), a store of value (there is no requirement for reserve of savings), or indeed an absolute standard of value (consumers bidding in the auction need only know the relative price of different goods and services, including labor). Money has no place in an economy with the grand action. … Uncertainty is ruled out by assumption." This how Mervyn King explained Arrow's and Debreu's proof of the invisible hand in The end of alchemy: Money, bankıng, and the future of the global economy (Mervyn King, 2016).

The Arrow-Debreu proof inspired the development of general equılıbrıum models and later dynamıc stochastıc general equılıbrıum models (DSGE) which are still relied on by policy makers today in spite of their failure in 2008 Fınancıal Crısıs. "DSGE models deal in aggregates, ignore complexity, see the economy as an equilibrium system, and flatten the intricate structure of an economy down to a single uniform dimension. The name is misleading. 'Dynamic' refers only to changes to a model equilibrium over time as it adjusts to external shocks, not to any internal dynamism. 'Stochastic', meaning randomly determined, refers to random perturbations such such as oil price shocks or technological developments which are treated as external effects. But these external effects come from a stable distribution and so can be estimated from past experience, and linear in the sense that small shocks have small effects and a shock twice as big as another has double the effect. "General" means that the model is supposed to include all markets, but omits derivatives and other forms of financial entanglements. The models assume that supply and demand drive prices to an equilibrium point where consumers are maximizing their utility, firms are maximizing their profits, and all markets clear." (Orrell, 2018).

Ratıonal expectatıons hypothesıs, (reh), and real busıness cycle, (RBC), and a number of nominal rigidities and market imperfections are embedded into DSGE models. Most common were price and wage rigidities and various forms of consumer myopia. These allowed for temporary demand shortages, on which central bank policy could have a significant short-run impact. In accepting the REH and RBC theory as the framework for macroeconomic analysis, DSGE modelers surrendered Keynes's emphasis on uncertainty. In DSGE models, there was no uncertainty, only contingently imperfect information within known probability distributions. DSCE models have a very limited role for the existence of money, medium of exchange, and thus provides an ideal diversion from the important facts of reality.

Economic agents according to David Orrell "Instead of behaving like independent NEWTONIAN particles, as assumed in mainstream neoclassical economics, participants of economic activities are actually closely entangled and engaged in a sort of collective quantum dance. As Karen Barad puts it, "Existence is not an individual affair. Individuals do not preexist their interactions; rather, individuals emerge through and as part of their entangled intra-relating.".

We need to reorient our focus to understand human behaviors and preferences as they are, not as they find it easy to model. Most real world resource allocation decisions are made by humans whose brains include a prefrontal cortex capable of ratiocination and limbic system which is coded by evolution to act in deeply instinctive and emotional ways. Marvin Minsky, the co-founder of the artıfıcıal ıntellıgence laboratory of mıt, in the emotıon machıne: commonsense thınkıng, artıfıcıal ıntellıgence, and future of the human mınd (Minsky, 2006)[1] shows the way how the human cognitive system can be studied to develop artificial intelligence to aid in improving resource allocation decisions as more and more such decisions are being assigned to be made by artificial intelligence (Ai) enabled machines. And in THE SOCIETY OF MIND (Minsky, 1986), he claims that what we call 'intelligence' is not a singular thing; rather, it is an emergent phenomenon that arises from collective interactions of many individual parts. The magic of intelligence is that when those parts are organized in a particular way, they can do things that no individual part could do on its own. Marvin Minsky called this description of intelligence 'the society of mind'. Iain McGilchrist in the master and hıs emıssary: the dıvıded braın and the makıng of the western world (McGilchrist, 2010) suggest that attention is not just another function alongside other cognitive functions. Rather, the kind of attention we bring to bear on the world actually alters the nature of the world we attend to. Attention changes what kind of a thing comes into being for us. In that way it changes the world. This transformative or world-changing aspect of attention can be seen in every form of relationship we encounter and experience. Adjusting our mode of attention can have far-reaching and profound effects, and one might call this striking ability 'the attention effect'. As a remarkable a phenomenon in its way as recognition in quantum mechanics of how the act of observation alters what is being observed. This is because, 'I am my attention, everything else is given, is not mine.' This unique role of attention has also been recognized in the new digital technologies of the modern 'attention economy', in which the human gaze is increasingly being monetarized and mined as a resource, again pointing to its central position in the landscape of the 21st century. The free service producers of Silicon Valley compete to capture our attention and emotional engagement and monetarize them to generate the cash flow necessary for their survival. The internet scene in China is different. The major source of their cash flow is not from advertising. The objective of science is said to be not to pander to human preconceptions but to reduce our ignorance and folly. Cognitive science, in Nick Bostrom's superıntellıgence: paths, dangers, strategıes (Bostrom, 2016), and in Max Tegmark's LIFE 3.0: beıng human ın the age of artıfıcıal ıntellıgence (Tegmark, 2013) is at the threshold of a breakthrough in artificial intelligence that may change how we see ourselves. We have become used to referring to mankind as Homo Sapıens. Sapience is the ability to think intelligently. This is now what is being challenged, and perhaps soon to be surpassed by Ai. Tegmark proposes replacing sapience with sentience–the ability to subjectively experience. He suggests rebranding ourselves homo sentıents in our mathematıcal unıverse: my quest for the ultımate nature of realıty (Tegmark, 2014).

In THE DEEP LEARNING REVOLUTION(Terrence and Sejnowski, 2018)[1], Terrence J. Sejnowski shows how learning algorithms extract information from raw data; how information can be used to create knowledge; how knowledge underlies understanding; and how understanding leads to wisdom. Ray Kurzweil in THE SINGULARITY IS NEAR: WHEN HUMANS TRANSCEND BIOLOGY (Kurzweil, 2005)[1] and in HOW TO CREATE A MIND: THE SECRET OF HUMAN THOUGHT REVEALED (Kurzweil, 2012)[1] explain why and how. The first use of the term "singularity" to refer to a future technology driven event seems to have been by John von Neumann in the late 1950s. It does not seem to have caught on until mathematician Vernor Vinge popularized the approaching "technological singularity". The term now is associated with Ray Kurzweil who predicted that computers will surpass the processing power of a single human brain by 2025, and by 2050 a single computer may match the power of all human brains combined by 2050. The SINGULARITY is now generally taken to mean the point at which Ai acquires "general intelligence" equal to a human being's. The SINGULARITY is important, not only because beyond this point machines will be able to outperform humans at every task, but also because Ai will be able to develop itself without human intervention and this Ai can therefore spin ever upward, out of our understanding.

The singularity or artificial superintelligence involves computers whose ability to understand and manipulate the world dwarfs our own, comparable to the intelligence gap between human being and, say, earth worms; developing utopians and dystopians. The utopians, Ray Kurzweil, GOOGLE's guru in residence for example, envisions a radical future in which humans and machines fully merge to expand our consciousness and conquer mortality. Other utopians see ARTIFICIAL GENERAL INTELLIGENCE enabling us in decoding the mysteries of the physical universe, understanding the universe at levels that humans cannot conceive of, and solving intractable problems. Dystopians disagree.

Algorithms increasingly make choices for us. More and more, these algorithms work by learning from the trails of data we leave in our newly digital world. Machine learning is the automation of discovery. It enables intelligent robots and computes to program themselves. The scientific method on steroids. In THE MASTER ALGORITHM: HOW THE QUEST FOR THE ULTIMATE LEARNING MACHINE WILL REMAKE OUR WORD (Domingos, 2015)[1], Pedro Domingos outlines each one of the machine learning' five major schools of thought -SYMBOLISTS, CONNECTIONISTS, EVOLUTIONISTS, BAYESIANS, and ANALOGIZERS- has its own master algorithm, a general purpose learner that you can in principle use to discover knowledge from data in any domain. The SYMBOLISTS' master algorithm is inverse deduction, the CONNECTIONISTS' is backpropagation, the EVOLUTIONISTS' is genetic programming, the BAYESIANS' is Bayesian inference, and the ANALOGIZERS' is the support vector machine. At its core machine learning is about prediction. Predicting what we want, the result of our actions, and how we achieve our goals from digital metadata. Neoclassical economics belong to the SYMBOLISTS' tribe.

Connectionism is about building computer networks that can learn. It is founded on "hebbian correlation" and "error back-propagation". Donald Hebb in the organızatıon of behavıor: a neuropsychologıcal theory (Wiley, 1949)[1] in 1949 stated that "when an axon of cell A is near enough to excite cell B and repeatedly or persistently takes part in firing it, some growth process or metabolic change takes place in one or both cells such that A's efficiency as one of the cells firing B, is increased." In other words, learning consists of strengthening connections that are frequently in use. Unlike behaviorists that insist the black box must remain closed, Hebb was interested in finding what changed in the black box, the brain, and guessed correctly that it was the strength of the synapse.

A few years after Hebb's insight Frank Rosenblatt built a computer program called perceptron, which consisted of two layers of "nodes" switches, the connections between which could be varied. Its job was to vary the strengths of connections until its output had the "correct" pattern. When 30 years later a third layer of nodes was added between the output and the input layers, the connectionist network began to take on properties of primitive learning machine, especially after being taught "error back-propagation". "Error back-propagation" means adjusting the strengths of connections between the units in the hidden layer and the output layer where the output was in error, and the adjusting the strengths in the previous connections, propagating the error-correction back up the machine.

It is time to explain the financial markets as they actually operate, not as, symbolısts, neoclassical economists assume them to operate, observing the way in which information is processed, observing the serial correlations, bonanzas, and sudden stops, not assuming these away as noise around the edges of efficient and rational markets. We need to present the world as is, not the world as neoclassical economists have assumed to make their mathematics easy. Economic history matters. We need to study the history of financial crashes as well as the theories and mathematics that failed to forecast them, but were required to formalize them.

At various stages in history the lust for easy riches has spread out from the afflicted few to consume the whole classes of society. This happened in Amsterdam in the 17th century when the road to riches was apparently strewn with tulips. In London in the 18th century when it was not so much a road as a seaway to the South Seas. In London again in the 19th century when it was railroad. In New York in the early 20th century when it was indeed a road, a railroad, and an airway combined, and in the late 20th century when it was the information superhighway.

All of these were 'bubbles', a period of rapidly rising equity prices in a particular sector that were unfounded and thus liable to collapse equally rapidly. Carlota Perez's TECHNOLOGICAL REVOLUTIONS AND FINANCIAL CAPITAL: THE DYNAMICS OF BUBBLES AND GOLDEN AGES (Perez, 2002)[1] makes the provocative claim that major epochal changes in how the economy uses technology happen periodically and evolve first of all an interval of hype and speculation, both intellectual and financial, followed by a crisis and then a long period of deployment. Perez demonstrates that big changes in technology entailed not just the extraordinarily rapid growth of few industries, but a "techno-economic paradigm shift". Alan Greenspan in 1990s used the expression several times to explain his monetary policies that enabled the dot.com bubble to Congress.

There is an observable pattern to economic booms and busts. They start with an anticipated exciting change in the economy. Managers and investors with the help of spin doctors collectively create a story about it, which initially begins as a plausible explanation, then morphs into an extrapolation, and then into an exaggeration. Eventually the data contradict the narrative, as optimism turn into pessimism boom turns into bust, and a bout of austerity follows. A rout in platform companies' stock prices since August 2018 has led many to ask if the tech industry is experiencing the classic sequence of Greek drama: HUBRIS, ATE and NEMESIS for the second time in two decades. First, in the second half of the 1990s ending in March 2000, and the second, since September 2018. De ja vu. The level of hype was particularly high, a consequence of ubiquity of data on the internet and some of the numbers were decidedly soft. However, the reactions of the ECB and Fed were not. In 2019, they cut interest rates and engaged in QE.

Brenda Spotton Visano in FINANCIAL CRISES: SOCIO-ECONOMIC CAUSES AND INSTITUTIONAL CONTEXT (Visano, 2006)[1] explains financial crises by identifying the roles of credit, technology and institutions played in the historical evolution of capitalism. Innovation drives the evolution of the capitalist system and the culture that is engendered ensures change will be perpetual. Innovation induced social and economic changes are profound and profoundly uncertain. An innovation's potential to offer material advance is fundamentally uncertain and dependent, in part, on the collective assessment of that potential.

Few years before the 2007-2008 FINANCIAL CRISIS triggered by some Americans in some parts of the United States defaulting in paying their mortgages, Brenda Spotton Visano concluded that the more revolutionary the innovation, the greater is the potential for a speculative enthusiasm to become widespread among the population. The more accessible the means by which one may speculate, the greater will be the intensity of the speculation in a given revolutionary innovation. The manner in which credit may either be extended to support and promote the prior speculation or contracted so as to facilitate the transmission of the distress depends critically on the level of development of the financial structure and the nature of the particular financial instruments and enterprises that comprise that structure. The longer the process of diffusing the revolutionary innovation, the more fragile the environment becomes. It is the manner in which these periods of major transitions, financial institutions enable the most spectacular of speculations.

Rarely in stock market history have so many investors made so much money from so few stocks going up for so long. Some 37% of the rise in the value of all firms in the S&P500 index since 2013 is explained by 6 of its members: ALPHABET, AMAZON, APPLE, FACEBOOK, MICROSOFT and NETFLIX. About 28% of the rise in Chinese equities over the same period is owing to 2 firms: ALIBABA and TENCENT. The median drop in value of those eight firms has been 21% in September and October 2018, double the decline in global stock markets. Some $900billion have vaporized by the end of October 2018. WALMART paid $16billion to buy 77% of FLIPKART, an Indian e-commerce

firm which in November 2018 is expected to lose $1billion in 2019 and more thereafter before the market rout which according to TV talk-heads are caused by a rise in global real interest rates, but also by decelerating growth, falling profit forecasts as a result, and rising capital intensity. Total investment for the 8 firms was $180billion a year between 2013 and 2018. Only one of the 8 firms needed capital markets to finance itself, NETFLIX.

We need to ask questions about objectives of economic activity. In defining the objectives of economic activity, the instrumental conventional wisdom, which have dominated the policy implementations of neoclassical economists for several decades, has simply assumed that maximizing growth in per capita GDP is an axiomatically desirable objective, and that inequality is justified because it helps maximize growth. Something is fundamentally wrong with the way economic performance and social progress is assessed. GDP estimates do not account for resource depletion and environmental degradation. GDP optimistically describes what is happening to total economic production and to the income generated from this production, whether this income accrues to a few people or many, to residents or to foreigners, to households or to firms. GDP could go up without a vast majority's income improvement. The single number GDP does not adequately summarize what people are experiencing argue Joseph E. Stiglitz, Jean-Paul Fitoussi, and Martin Durand in MEASURING WHAT COUNTS: THE GLOBAL MOVEMENT FOR WELL-BEING, THE MOVEMENT FOR NEW METRICS, BEYOND GDP[1] (OECD and Stiglitz, 2019), and state: "We needed a dashboard if we wanted to reflect the many dimensions of success or deprivation - including inequality, economic insecurity, and sustainability." (OECD and Stiglitz, 2019). Many circumstances conspire to extinguish scientific discoveries, especially those that cause discomfort about culture's sacred norms. As species, we cling to the familiar, comforting conformities of the mainstream. Deep inquiry into the objectives of economic activity and into the links between economic variables, such as income, and fundamental objectives, such as sustainability of human well-being in its universe, GAIA, the living Earth, is essential to good economics for our survival, no matter how difficult.

There is compelling evidence that the biological and physical components of our planet are part of a single network that operates in a self-regulating way to maintain conditions that are broadly suitable for the existence of life, but that undergoes fluctuations on all scales, including ice age-interglacial rhythms and mass extinctions, analogous to the fluctuations that occur in self-organizing systems on the edge of chaos. GAIA theory is a way of studying structuring matter at a molecular scale by slotting each atom into its needful place. It is a way of understanding flows of energy on every scale from that of the smallest living cell to that of the whole living planet. It an approach of understanding of growing order and surprise in a universe that its physical respects tend towards entropic stagnation. Life is Earth's entropy reduction process.

The concept GAIA postulates the idea that the Earth is alive. Aspects of the atmospheric gases and surface rocks and water are regulated by the growth, death, metabolism, and other activities of living organisms. The entire planetary air system is "metastable", stable in its reactive instability. The persistence of chemical reactivity arises from the combined actions of living beings. The entire planetary surface, not just the living bodies but the atmosphere that we think of as an inert background, is so far from chemical equilibrium that the entire planetary surface is best regarded as alive. The Earth is a single, mega-living system. Symbiosis is simply the living together in physical contact of organisms of different species. Partners in symbiosis, fellow symbionts abide in the same place at the same time, literally touching each other or even inside each other. A nuanced view of universe, not akin to neoclassical economists'.

Lynn Margulis explains that view in SYMBIOTIC PLANET: A NEW LOOK AT EVOLUTION (Margulis, 1998)[1]. She shows that symbiotic origins of novel life forms, symbio-genesis, has been far more common than ever dreamt by evolutionary biologists steeped in the DARWINIAN tradition. A tradition that emphasizes competition far more than cooperation in the evolutionary process. Orthodox economists' overemphasis of atomistic competition empowered by Ai and algorithms of digital platforms can in fact lead to wasted efforts, missed opportunities, and above all an inability to break out of established patterns argues Edward Tenner in THE EFFICIENCY PARADOX: WHAT BIG DATA CAN'T DO (Tenner, 2018). More and more of what we choose to spend our money on is itself some form of knowledge. More and more of things we wish to buy are not things, they are not "things" at all. They are intangible; that is to say, strictly speaking, they are neither a good nor a service. They are non-things, products of human mind, not manufactures but MENTEFACTURES. Examples include computer software, medical treatments, films, recorded music. We have reached a stage where knowledge produces knowledge. The knowledge components of consumption goods possess some striking characteristics. The same characteristics as knowledge applied to the production process. They occupy no physical space and have no weight. Consequently, they take up no real resources whatsoever. If I consume more I do not reduce the quantity available for you to consume. Infinite expansibility. Whether a film is seen by 200 or 2,000,000 or more people has no effect on its cost of production. Orthodox economists' quandary. Jeremy Rivkin in THE ZERO MARGINAL COST SOCIETY: THE INTERNET OF THINGS, THE COLLABORATIVE COMMONS, AND THE ECLIPSE OF CAPITALISM (Rifkin, 2015)[1] heralds "zero marginal cost society" where the price of every incremental good and service, from search to software, from news to energy, will plunge towards "free" as every device and entity in the world is subsumed in an INTERNET OF THINGS where exponential network effects yield a new economy of leisure and abundance. These MENTEFACTURES have four economic properties. Scalability; sunkeness; spillovers; and synergies. These properties can exist with tangible assets also, but intangibles exhibit them to a greater degree. THE FINANCIAL CRASH OF 2008, in the long sweep of history, may prove as a radical turning point as the 1929 crisis of free market capitalism, FINANCIAL CAPITALISM, that in the 1930s gave birth to MANAGERIAL CAPITALISM, and the crisis of managerial capitalism in the 1960s and 1970s that evolved to ASSET MANAGER CAPITALISM from 1980s to 2008. The GREAT DEPRESSION of the 1930s led to a regime devoted to the maintenance of full employment. The GREAT INFLATION of the 1970s led to the maintenance of low inflation. The GREAT ILLUSION of the 1990s, some claim, will lead to a regime devoted to the maintenance of financial stability. So far in October 2018 according to elegant Christine Laggard of IMF, in President Trump's America evidence is supportive of increased risks of financial instability.

For more than 50 years, the dominant strain of academic economics has been concerned with exploring, through complex mathematics, how economically rational human beings interact in markets. The conclusions reached have appeared optimistic, indeed at times PANGLOSSIAN. Kenneth Arrow and Gerard Debreu illustrated that a competitive market economy with a fully complete set of markets was PARETO-EFFICIENT. Neoclassical economist, Robert Lucas, argued that if human beings are not only rational in their preferences and choices but also in their expectations, the macro economy will have a strong tendency toward equilibrium, with sustained involuntary unemployment, a non-problem. RATIONAL EXPECTATIONS THEORY.

Rational expectation theorist "followed the dominant paradigm of the universal applicability of subjective probability. Assumptions about expectations were deductions about behavior based on axiomatic rationality. The resulting theory of 'rational expectations' requires that the expectations of all agents – firms, households and government – must be consistent not only with each other but with the model which purports to describe it. This approach assumed not only that there was a true model of 'the world as it really is', not only that economists knew what the model was, not only that everyone – from the titans of Wall Street to the humblest of peasant farmers – knew what that model was, but that they all formed consistent expectations on the basis of that knowledge and acted on these expectations." (Kay and King, 2020).

Neoclassical economics have developed models of firms behaving as monopolies, duopolies, and perfect competitors, but in the realm of few firms their modeling and predictions run into difficulty. Mainly, because in modeling, they assume economic agents to be hyper-rational and well informed, time to be instantaneous, and place nonexistent, economic agents to be represented by a single prototype, and are left isolated seeking equilibrium in a system fraught with change. The message of neoclassical economics is that is humans can just behave rationally enough, and if we possess enough information, then the economy will be revealed as a universe of clockwork predictability. Even the uncertainty of neoclassical economics is of the well-behaved kind. The dream of clockwork universe ended for science in the 20th century, and is to end for economics in the 21st. The economy is too complex, too nonlinear, too dynamic, and too sensitive to the twists and turns of chance to be amenable to prediction over anything but very shortest of terms. The EFFICIENT MARKET HYPOTHESIS appeared to illustrate that liquid financial markets are driven not by the patterns of chartist phantasy but by efficient processing of all available information, making the actual price of a security a good estimate of its intrinsic value. EMH stands explicitly for the notion that entrepreneurship is impossible in financial markets. Economists therefore provided arguments for the proposition that totally free markets achieved the objective of allocative efficiency. And they also argued that allocative efficiency and income growth over time were desirable objectives, and that increased income delivered increased utility, which they equated with life satisfaction. This was in part because any deeper inquiry into the relationship between income and welfare or happiness would have interfered with mathematical precision, which required a precisely defined maximand. Regrettably, as a description of neoclassical academic economics, this may be construed as simplification. "Dramatizing the impact of banishing entrepreneurs is the contrast between those who cast their bets in favor of the subprime schemes and those who bet against them, and fought to expose the fraud.

government agencies and development banks, is overwhelmingly micro-

On the wrong side of the trade- the buyers of bad mortgages and filigreed bonds – were most of the world's central banks, the World Bank, the Internatıonal Monetary Fund, Fannıe Mae And Freddıe Mac, Cıtıgroup, Merrıll Lynch, Deutche Bank, and Bank Of Amerıca. All commanded easy access to government funding and safety nets and all were backed to the hilt in their mortgage enthusiasms by the global financial constabulary, the universities, the charities, and the most sophisticated politicians, such as Barney Frank and Chris Dodd." Wrote George Gilder in Wealth And Poverty: A New Edıtıon For The Twenty-Fırst Century (Gilder, 2012). Overhauling the way economics is taught is to produce students better equipped to understand the modern world if that is the goal. Even better, it should improve the discipline's ability to describe and predict the economic reality. The economic crisis is also a crisis for economic theory. Most analyses of the evolution of the 2008 crisis invoke three themes – contagion, networks, and trust – yet none of these play a major role in orthodox economic theory, argues Alan Kirman in Complex Economıcs: Indıvıdual And Collectıve Ratıonalıty (Kirman, 2011). The economy and the financial sector had organized itself into a highly interdependent system. Paradoxically, the excessive interlocking of the components and the heavy trading of the derivatives actually concealed information rather than revealed it. Thus, the system organized its own self destruction, leading to a radical change in the aggregate situation. This is interaction and interdependence and breakdown of relations of trust which had emerged and not one of an external shock to a stable market. The direct interaction between individuals, firms, and banks does not simply produce imperfections in the functioning of the economy but is the very basis of the functioning of a modern economy. The economy needs to be considered as a complex adaptive system in which the agents constantly react to each other. We are familiar from statistical physics and biology for example, the behavior of the aggregate cannot be deduced from the behavior of the average or "representative" agent. Just as the organized activity of an ants' nest cannot be understood from the behavior of a "representative ant". All ants are endowed with competence wıthout comprehensıon. The macroeconomic phenomena should not be deduced from the representative individual and the representative firm. Furthermore, the representative firms are managed by people endowed with "comprehension". The neoclassical economic theory considers each "representative agent" in isolation, but "representative agent's" fitness is a complex function of all "representative agents". If "representative agents" are independent, the relative frequencies of their variants rapidly converge to the maximum fitness point and remain in equilibrium thereafter. But if "representative agents" interact, evolution – the search for maximum fitness – is vastly more complex. Echoing Fred Hoyle's observations in the ıntelligent unıverse: a new vıew of creatıon and evolutıon, the universe is "an inextricable loop where everything exists at the courtesy of everything else". For instance, if electrons were much lighter, there would be no stable stars, and if they were much heavier, there could be no ordered structures such as crystals and DNA molecules. If protons were 0.2% heavier, they would decay into neutrons unable to hold electrons, so there would be no atoms. If they were instead much lighter, then neutrons inside of atoms would decay into protons, so there would be no stable atoms except hydrogen. Econometrics is the application of classical statistical methods to economic and financial series. The essential tool of econometrics is multivariate linear regression, an 18th century technology that was mastered by GAUSS before 1794. Standard econometric models do not learn. It is hard to believe that something as complex as 21st century finance could be grasped by something as simple as inverting covariance matrix. Every empirical science must build theories on observation. If the statistical toolbox used to model these observations is linear regression, the researcher will fail to recognize the complexity of data, and the theories will be simplistic, not very useful. It seems econometrics was an important reason economics and finance have not experienced meaningful progress over the past decades. Marcos Lopez De Prado in Advances In Fınancıal Machıne Learnıng (Wiley, 2018)[1] shows the epistemological difference and strengths of machine learning over discretionary portfolio managers. Discretionary portfolio managers make investment decisions that do not follow a particular theory or rationale, if there were one, they would be systematic discretionary portfolio managers. They consume raw news and analyses, but mostly rely on their judgement or intuition. They may rationalize those decisions based on some story, but there is always a story for every decision. Because nobody fully understands the logic behind their bets, investment firms ask them to work independently from one another, in silos, to ensure diversification. Joseph Schumpeter believed that speculative manias often occur with the inception of a new industry or technology, when people overestimate the gains and underestimate the effects that the attraction of new capital will have in depressing returns. charles kındleberger, in manıas, panıcs and crashes: a hıstory of fınancıal crıses (Kindleberger, 2005)[1], suggested something similar. The first stage is displacement, which excites speculative interest.

This is followed by positive feedback, as rising stock prices attract new investors who then drive prices up further. The final stage is euphoria, when investors take leave of their senses. In JOSEPH SCHUMPETER's writings, the economy evolves by cracks and leaps. Booms and busts are endemic, and are to be welcome as the result of the economy's life force. Similarly, he excoriated the orthodox economist's emphasis on the benefits of perfect competition and even thought that monopoly could be beneficial as a spur to innovation. Physicists call a sudden change in the character of a system a phase transition. In random networks, the phase transition from small clusters to giant clusters happens at a specific point, when the ratio of segments of edges to nodes exceeds the value of 1. One can think of the ratio of one edge to one node as the 'tipping point' where a random network suddenly goes from being sparsely connected to densely connected. THE S-CURVE is the shape of phase transitions of all kinds, the shape of creative destruction, ice melting, the spread of new technologies, paradigm shifts in science, the fall of empires. THE TIPPING POINT could well be entitled the S-CURVE. Many phenomena we think of as linear are in fact S-CURVES, because nothing can grow without limit. Because of relativity, and contra NEWTON, acceleration does not increase linearly with force, but follows an S-CURVE centered at zero. S-shaped functions describe many natural growth processes as well as the adoption and diffusion of innovations, be they new industrial techniques or new consumer items. Initially slow growth accelerates at the J-BEND and if it is followed by a rapid ascent whose rate of increase eventually slows down, forming the second bend that is followed by a slowing ascent as the growth becomes minimal and the total approaches the highest achievable limit of a specific parameter or a complete saturation of use or ownership. By far the best known, and the most often used function of the S-SHAPED trajectory is the one expressing logistic growth. Unlike with exponential unbounded growth, whose rate of increase is proportional to the growing quantity, relative increments of logistic, limited, growth decrease as the growing quantity approaches its maximum possible level that in ecological studies is commonly called carrying capacity. "Networks have effects, called 'network effects' on the people and things around them. The more people participate in the network, the bigger the effects are. As a network grows, it exerts pressure on people to join. This pressure is stepped up at two tipping points. The first occurs when a critical mass of users is reached. When about 20-25% of a population are connected, it makes ever more sense for others to join. This happens most of all in communication network such as email and social networking sites (SNS). After some time, when about two-thirds of people are connected, a second tipping point arrives. Saturation sets in and connection rates slow down. Yet from this point onwards, people are more or less forced to participate or risk social exclusion. In developed countries, both tipping points have already occurred for email and (SNS)." (Dijk, 2020). "Networks also exert influence on things – not only on computers, telephones and TV-sets, but on all kinds of objects, such as machines of industrial work and the devices of Internet of Things. There is a pressure to connect all of them to speed up and control production and distribution processes. As networks are systems, their connections have to follow common standards. A network with standards that are accepted by many people has power. This is the power to decide who is able to connect to the network and use it for communication with others. Broadly, people prefer a general standard because in that case they can reach many others in the same system.

This is one of the reasons for the steady popularity of MICROSOFT's operating systems and other software. Next to TRANSMISSION CONTROL PROTOCOL (TCP) INTERNET PROTOCOL (IP) operating systems such as WINDOWS, Mac OS and LINUX, browsers such as Internet Explorer, Mozılla Fırefo and Google Crome, mark-up languages such a HTML, mobile phones with Androıd (Google) or OS (APPLE),and search engines such as GOOGLE SEARCH and BING or the Chinese BAIDU, and WeChat, are important software standards." (Dijk, 2020).

6.Not so representative agents in their ever changing diverse environments

The contemporary American business corporation, though legally a creature of the state from which it derives its charter, has a substantial but somewhat indefinite sphere of autonomy and privacy. In the United States it is known as "corporate personhood". The American legal system considers a corporation to be an individual in many ways, bizarrely one that is psychopathic in the sense of having no conscience and being solely interested in profits. Its defining features are limited liability and profit maximization. The corporation is therefore a tool for generating wealth while limiting responsibility. The first SUPREME COURT case on the rights of corporations was decided in 1809, a half a century before the first comparable cases on the rights of African Americans or women. The supreme court heard its first case explicitly addressing the constitutional rights of African Americans, dred scott v. stanford, in 1857. The court held that African Americans had "no rights which white man was bound

bound to respect". The first women's rights case, BRADWELL v. ILLINOIS, on whether women had a right to practice law, was heard in 1893, and the court ruled against the woman. The first corporate rights case was brought to the SUPREME COURT by the first BANK OF THE UNITED STATES, the brainchild of Alexander Hamilton chartered by the first CONGRESS in 1791. It pitted the legacies of two founding fathers, Alexander Hamilton and Thomas Jefferson. Their conflict spilled over into the struggle over constitutional protections for corporations. HAMILTONIANS were CORPORATIONALISTS, proponents of corporate enterprise who advocated for expansive constitutional rights for business. JEFFERSONIANS were POPULISTS, opponents of corporate power who sought to limit corporate rights in the name of the people. Adam Winkler in WE THE CORPORATONS: HOW AMERICAN BUSINESSES WON THEIR CIVIL RIGHTS (Winkler 2018)[1] summarizes how corporations used test cases, and novel legal claims made in a purposeful effort to reshape the law reveals the enormous influence corporations had on the birth of American democracy and on the shape of the CONSTITUTION itself. He shows how America's most powerful corporations won fundamental rights and turned the CONSTITUTION into a weapon to impede the regulation of big business. The notion that corporations should devote themselves to maximizing profits is often to be the bed rock principles of corporate law and governance. In the early history of corporations, however, business corporations were much different. Corporations could only be formed if they served public purposes. Today, in part because of the DARTHMOUTH COLLEGE v. WOODWARD, that rule no longer applies, and contemporary American business corporations are considered private entities that need not serve any explicit objective. Indeed, corporate officers who fail to focus on the profitability of their corporation, at least in the long run, would be in breach of their fiduciary duties. Corporations have fought to win a greater share of the individual rights guaranteed by the CONSTITUTION. First, they won constitutional protection for the core rights of corporations identified by BLACKSTONE in his COMMENTARIES: rights of property, contract, and access to court. Then they won the rights of due process and equal protection under the FOURTEENTH AMENDMENT and the protection of the criminal procedure provisions of the CONSTITUTION. In the 20th century, the SUPREME COURT said that there were nonetheless limits to the constitutional rights of corporations. They had property rights but not liberty rights. Eventually, however, the SUPREME COURT broke down that distinction and began to recognize corporations to have liberty rights such as freedom of the press and freedom of association. "In 1886 the MICHIGAN SUPREME COURT ruled that a corporation was entitled to the same legal status as a person, with rights including freedom of speech. In 1916, when HENRY FORD tried to prioritize business investments over dividends, his stockholders (the DODGE brothers) successfully sued." (Orrell, 2018) In 1914, Henry Ford announced that he would begin paying workers $5 a day doubling their wages when labor shortages were not prevalent. Furthermore, he lowered the price of his cars even as significant improvements were introduced and inventory sold out. He decided that the stockholders were earning enough and in 1916 announced that FORD company would not distribute a special dividend to stockholders despite having on hand a cash surplus of $60million. During the trial, Henry Ford insisted that FORD company had the right to make decisions in the interest of the public even if stockholders had to sacrifice. He could have claimed, as executives often do these days when pressed to defend socially responsible policies, but Henry Ford refused on principle. The court ruled against FORD and Henry Ford's public-spirited view of the corporation. "The main purpose of a corporation is to maximize the shareholders' profits" (Orrell, 2018) was the court's decision in Dodge Brothers v. FORD MOTOR COMPANY. Indeed, ever since the Dodge Brothers sued to stop Henry Ford from pursuing policies to benefit employees and the broader public without regard to stockholders, the law required that all corporate activity be designed in the long run to enhance profits. Officers had to obey that legal mandate or risk being held in violation of their fiduciary duties to the corporation. As a result, corporations are not "free" in the way that individuals can be. A person can choose her own values. A corporation, however, is legally obligated to prioritize profit, at least in the long term. "As Mılton Frıedman wrote in 1962, few trends could so thoroughly undermine the very foundations of our free society as acceptance by corporate officials of a social responsibility other than to make as much money for their stockholders as possible." (Orrell, 2018).

Corporations are rational economic man, homo economıcus, writ large, according to orthodox neoclassical economic theory. Like the individual citizen, the corporation is taxed and regulated and may be rewarded with public employment, punished for mischief by judicial action, and possibly called on for sacrifice in the national interest, and may be saved from bankruptcy with generous handouts, as the western banks' bailouts were in the great fınancıal crısıs. The people running a corporation are occasionally criminally responsible when the corporation has done something illegal. However, they are not when the corporation does something legal yet immoral. Financial regulators and the Wall Street megabanks they oversee like to say the great fınancıal crısıs was concentrated in the so-called shadow banking system, the gray area occupied by nonbank financial institutions that were outside the more heavily regulated commercial banking sector. Much of the attention and debate regarding troubled institutions has focused on the failures or near-failures of the nonbank troika of Bear Stearns, Lehman Brothers, and AIG. The 2010 dodd-frank act was sold as a way to give regulators important powers they did not previously have, to oversee such large, risky firms outside commercial banking. Meanwhile, it was CITIGROUP that received the most generous government assistance of any bank during the great fınancıal crısıs. Cıtıgroup was a federally regulated bank holding company containing a federally insured bank. It was subject to the full range of supervisory authorities. It had not one but multiple federal banking agencies already overseeing its activities. It was specifically overseen by the Federal Reserve Bank Of New York and its chief Timothy Geithner, a principal architect of the great fınancıal crısıs policies during both the Bush and Obama administrations. He was Robert Rubin's protégé when Robert Rubin was Clinton's Treasury Secretary. Timothy Geithner became Obama's Treasury Secretary, and Obama replaced him by a former Cıtıgroup employee Jack Lew.

CITI was created in 1812, two days before the start of the WAR OF 1812 and a year after the closing of the first Bank Of The Unıted States. CITI BANK OF NEW YORK was conceived to serve the financial needs of New York merchants and the young national government. The stockholders of the Bank Of The Unıted States provided more than 50% of the startup capital in the Cıtı Bank Of New York. The new bank can be seen as a direct descendent of the United States' first central bank. It was the first corporation created by the first congress. CITI's first president, Samuel Osgood, had been a member of the contınental congress and America's first postmaster general. As today, CITI, at its inception was deeply intertwined with the national government with benefits for both parties. When CITI was created, the bank's capital was something of a mirage, and the customers were often the directors themselves. The founding directors exempted themselves from putting up any cash at all. Instead, they could take out indefinite loans from the bank by using their shares as collateral. When the owners not only fail to put up much capital but also lend bank funds to themselves, they crate risks on both sides of the balance sheet. As of February 1814, a quarter of the bank's lending commitments were tied up with 12 of the bank's 750 customers. Unlike the age of the great fınancıal crsıs's too-bıg-to-faıl banks, when the PANIC OF 1837 proved too much to bear for CITI, there was no taxpayer bailout. The 1837 Fınancıal Crısıs and the economic downturn that followed was America's fırst great depressıon. John Jacop Astor bought a piece of the bank and provided the needed capital. Astor was New York City's preeminent trader and real estate magnate. Unlike the present day magnates, the frugal Astor carried little debt and had the ready cash to buy controlling interest in the bank and install Moses Taylor on CITY's board. Taylor would eventually lead the bank beginning in the 1850s through a decade of stability and success. In striking contrast to the government-backed modern CITI, which has careened through long periods of serial crisis, the 19th century version of the bank seems to have been heedful of the lessons of its 1837 near-collapse and did not repeat the mistakes that required a private rescue. While the bank had been founded by government action and would come to rely on federal help throughout its history, CITY in the 19 th century became a pillar of financial strength that not only consumers and businesses but even the government itself would look for assistance in times of crisis. In contrast to the periods of instability in the bank's early years and also in the 20th and 21st centuries, Taylor's arrival at the bank marked the beginning of roughly three-quarter of a century of stability without government backstop. At its lowest point in the Taylor era, CITY BANK's ratio of equity capital to assets stood at about 16%. The ratio of the modern CITIGROUP rarely rises near 10%.pillar of financial strength that not only consumers and businesses but even the government itself would look for assistance in times of crisis. In contrast to the periods of instability in the bank's early years and also in the 20th and 21st centuries, Taylor's arrival at the bank marked the beginning of roughly three-quarter of a century of stability without government backstop. At its lowest point in the Taylor era, CITY BANK's ratio of equity capital to assets stood at about 16%. The ratio of the modern CITIGROUP rarely rises near 10%. Taylor's CITY was highly capitalized, though it became less so overtime. The equity capital ratio was more than 50% in1841; 35% in 1849; below 20% in 1862; and it remained around 16% from 1878 to 1891. The capital ratio became smaller over time, because the bank's deposits grew. During 1870s, when the bank's deposits stood at $10million, his personal deposits were more than 40% of this total. Under Taylor, the bank's capital ratio was roughly in line with industry peers, but CITY was safer because it had more liquidity. During the PANIC OF 1857, CITY BANK's deposits increased 42% when several of its competitors failed.

A year after the PANIC OF 1893, CITI became the largest bank in the United States, two years after James Stillman became its president. Under Stillman the bank grew organically, not relying on mergers. The exception was CITY's purchase of thırd natıonal bank in 1897, a bank that provided a variety of services for smaller banks outside of New York city. The United States, with the Coınage ACT OF 1873 attached the US dollar exclusively to gold, replacing Coınage ACT OF 1834 that attached the US dollar to the ratio of silver to gold at 16 to 1. With Sherman Sılver Purchase Act OF 1890, the US had moved from a gold standard for its currency to a situation in which US Treasury paper could be exchanged for either gold or silver. This scared foreign investors to trade their US notes for gold, causing gold to flow out at an alarming rate. As always throughout recorded history, doubts about the value of a nation's currency triggered economic disruption and destruction. Robert J. Shiller in narratıve economıcs: how storıes go vıral & drıve major economıc events (Shiller 2019)[1] explains the gold standard versus bimetallism narratives triggered 1893-1899 depression. In 1893, nearly a third of US railroads would go bankrupt. President Grove Cleveland persuaded CONGRESS to repeal the silver law, but CONGRESS instead, raised high tariffs on foreign goods even higher, adding another brake on economic growth. Washington-created monetary chaos put extreme pressure on banks nationwide. More than 500 banks failed. Yet CITY, overseen by Stillman, remained and island of stability. Instead of looking to Washington for Bailouts as it would do later in its corporate life, the bank was where Washington looked for help when politicians had gotten taxpayers into a jam. Stillman, recruited Frank Vanderlip, assistant Treasury secretary, to be his vice president. As Assistant Secretary of Treasury, he was in charge of the relationships between Treasury and the National Banks. He urged the banks to open accounts with the CITY. By restricting branch banking, regulators all but forced smaller banks to develop with other banks, especially in New York, correspondent relationships. The combination of Washington-created advantages and Frank Vanderlip's marketing CITY's deposits doubled by 1905. Vanderlip also pushed the old-fashioned commercial bank into a significant role in TREASURY BOND trading and investment activities. The PANIC OF 1907 is commonly remembered as a crisis managed and resolved by a private citizen, J. Pierpont Morgan. While Morgan certainly led the management of the crisis and put Morgan money into the solution, Treasury Secretary Cortelyou pledged $25million on behalf of the US government, with the funds deposited in CITY, $8million, Fırst Natıonal, $4million, and Natıonal Bank Of Commerce, $2.5million among other New York banks. These strong commercial banks would then have more to lend to the firms that were struggling. In CITY's Stillman era, even the federal government could count on Cıty for help in times of crisis. But under Vanderlip, those roles would be reversed. Vanderlip's strategy transformed Cıty from a specialized wholesale bank into an all-purpose intermediary providing a wide array of financial services to a variety of customers at home and abroad. In a move that would be echoed almost 90 years later with the creation of CITIGROUP, Vanderlip actually pushed CITY into capital markets before it was formally permitted. By 1920, CITY had 55 foreign branches and did not have enough trained men to run them. Rapid growth, distracted CEO and hard-to-quantify risks seemed to be combined at CITY. The office of the comptroller of the currency was required by the Federal Reserve ACT OF 1913 to conduct on-site examinations of CITY and all other national banks twice a year. In June of 1919, a federal examination report disclosed problems with CITY's management and its loan portfolio of their foreign branches. Many loans were intertwined with the fates of shaky governments overseas. They grew to 97 in 1930. After few years of conservative banking to put the books in order Charles E. Mitchel did not just want to be America's banker,but its broker too. His vision was to sell financial services that had previously been available only to the wealthy individuals and institutions to America's burgeoning middle class by persuading them to become shareholders. Under Mitchell, CITY aimed to become a sort of financial supermarket for America's growing middle class. By mid-1929, CITY had attracted more than 230,000 such customers with $62million in deposits. CITY was lending heavily in the call loan market in which investors would buy securities from brokers with a small amount down, borrow the balance, and put up the purchased stock as collateral. Mitchell had dreamed of turning America into a nation of stockholders, and serving millions of them with a new type of financial supermarket. He went a long way toward achieving both goals, but thanks to his mistakes overseas and the FED's at home, his bank was hobbled and his brokerage, Natıonal Cıty Company, was hardly worth a decent sum. Natıonal Cıty Company was not directly owned by Cıty BanK, but was separately owned by the bank's shareholders, so when its value imploded, Cıty did not have to record a loss.

Yet CITY endured another crisis, with a big help from taxpayers. Mitchell became the target for politicians determined to regulate and separate trading from commercial banking. Given his market boosterism prior to the 1929 CRASH, he became the symbol of 1920s excess. As the great depressıon deepened the press increasingly pictured banks as villains rather than victims. Bankers, Charles E. Mitchell foremost among them, were reviled as "banksters". As Ferdinand Pecora, chief counsel to the SENATE commıttee on bankıng and currency showed the CITY, under Mitchell, borrowed directly from the FED, made a habit of refusing to recognize problems in the overseas loan portfolio. CITY and its WALL STREET affiliate disclosed very little to regulators or even to its own investors. And yet, in 1933, the government's purchase of preferred stock in CITY was one of the largest of its bank investments. CITY sold $49million, CHASE $46million, Contınental sold $50million of preferred stock paying 5% annually to Reconstructıon Fınance Corporatıon. Just as in 2008, federal officials in the 1930s wanted 'healthy banks' to accept government investment so that the weak banks that really needed it would not be stigmatized by accepting federal assistance. The election of President Franklin Roosevelt in 1932 not only separated banks from Wall StreeT but essentially turned them into public utilities. The result was a banking system largely protected and controlled by the federal government. Then, in the 1940s, Washington would repeat what it had done in the 1860s, regulate US banks with the primary goal of funding a war. From 1941 to 1945, US government debt more than quintupled. This would not be last time that government regulation encouraged private banks to loan money to government, nor the last time that bankers seized the opportunity to get regulatory relief for doing so. The combination would become a recurring theme in the era of government backed banking. In 1955, Cıty Bank bought fırst natıonal bank of the cıty of New York and the combined firm was called fırst natıonal cıty bank of New York. By the early 1950s, loans were bigger part of the balance sheet than investments. Once again the Cıty expanded its overseas operations. Cıty's overseas operations had been erratic from the initial success during Vandelip years to Russian and Cuban debacles, to the partial revival under Charles Mitchell before the disasters of the great depressıon. Banking is different from other industries, because the taxpayer is often forced to stand ready to offer assistance when a big bank stumbles. Outstanding loans to less developed countries at the New York's 8 largest banks increased from $33billion in 1977 to nearly $60billion in 1984 with such loans representing more than 10% of total assets and more than 250% of capital reserves for the 8 banks at their peak. By 1973, foreign deposits at CITY exceeded domestic deposits. Cıty's CEO, Walter Wriston's most remarkable achievements were rebranding it Cıtıbank in 1976 and persuading Washington regulators that lending money to governments in developing countries were nearly risk-free. The big American banks were taking 'petrodollar' deposits from Middle Eastern depositors and recycling them into loans for countries rising out of poverty. The largest 9 American banks had $39.6billion on loan to developing countries, excluding oil-exporting states in 1979 according to FED. Moreover, these banks' capital totaled only $21.9billion. In theory, they could all be forced into insolvency if only half of their loans were to default. Wriston had proclaimed that counties do not go bankrupt. This turned out to be true only in the sense that Washington would not let them fail, especially when they owed so much to banks like Cıtıbank. The megabanks were faced with an overhang of exposure from their loans to less-developed countries. Then as now, Washington regulators enjoyed broad discretion in applying capital rules to the banks they oversaw. The FED, the comptroller, and the FDIC had basically two alternatives. The first was to take a hard look at the capacity of Mexico, Brazil, Argentina, and the others to pay their loans and reduce reported capital levels for the megabanks accordingly. This meant requiring the banks and their stockholders and creditors to accept the consequences of their bad decisions, but also accepting any collateral damage that might occur in the financial system. The alternative option is to look the other way and decide not to enforce the capital standards, allowing the megabanks years to work through their problems. Federal officials went for option two and exercised "forbearance". They decided that to do otherwise was to allow a cascade of failures of giant financial institutions. Too-Bıg-To-Faıl. A primary argument in favor of forbearance relates to the fear of systemic collapse. As in 2008, in the 1980s virtually all major banks were suffering to some degree from the same problem. In the first case they had over lent to Latin America. Years later they would shovel to many loans to US homebuyers. The history of forbearance shows that it is appealing to government officials when it allows

them to avoid having to manage the closure of a big firm. Regulators did not cut any slack to hundreds of smaller banks that failed during 1980s and were summarily shuttered. Forbearance allowed a number of big New York banks to survive by allowing them to fudge the value of their assets during Latin American debt crisis of the early 1980s. When debt crisis exploded in the early 1980s, the US government first tried sending aid to foreign governments that had borrowed too much while also exercising regulatory forbearance at home, allowing banks like Cıtıbank to pretend they were healthier than they were. In the mid-1980s Washington pursued a plan named after James Baker, Reagan's second Secretary Treasury. The idea of the Baker Plan was to exchange new lending to the indebted countries in return for market-oriented reforms such as tax reduction, privatization of state-owned enterprises, reductions in trade barriers, and investment liberalization. Otherwise known as Washıngton Consensus. For years, Washington seemed to think that the problem involved a temporary shortage of liquidity. As James Freeman and Vern McKinley explain in Borrowed Tıme: Two Centurıes Of Booms, Busts, And Baılouts At Cıtı (Freeman and McKinley 2018)[1] that is, probably, why many in Washington figured that extending and pretending with Latin American loans might allow enough time for both the borrowers and lenders to recover their financial health. The idea of the BRADY PLAN was to have the lenders accept lower repayments in exchange for more liquid, tradable assets. The lenders would trade many of their old, dodgy loans for new bonds issued by foreign governments that had lower interest or principle payments but were backed by US Treasury Bond as collateral. Walter Wriston, the leading architect of the Latin American debt crisis, retired from Cıtıbank in 1984 to be replaced by John Reed. In 1987, CITIBANK put aside $3billion loss provision against Latin American debt wiping out the last 4 years of earning under Wriston. Notwithstanding the Black Monday Crash of 1987, Cıtıbank made it through relatively unscathed. However, Reed had to deal with Cıtıbank's ailing domestic loan portfolio to real estate developers. Reed and his senior team were mainly marketers and operations executives who succeeded in building a large consumer bank, but lacked a thorough understanding of lending and underwriting. Even after experiencing the Latin American debt debacle Reed had allowed CITI's commercial bank to make big bets on the US real estate market. Having witnessed the crisis years in sovereign borrowing that exposed the flaws in the Wriston model, Reed continued to run the bank with minimum capital. By the summer of 1990, Donald Trump was negotiating with Cıtıbank and other creditors who had extended him a total of $2billion in bank debt and more than $1billion in bond debt. Cıtıbank and other banks gave him another $65million in emergency financing requesting Trump to sell his personal assets. He refused. CITIBANK having lent a total of $1.1billion was most conciliatory negotiator largely in the event Trump cedes control of his assets, Cıtıbank had the most to lose. Some of Cıtıbank's original loans to Trump were unsecured. The leaked report of the Comptroller's examination to New York Tımes in 1992 singled Cıtıbank as the nation's largest mortgage lender in 1989. Donald Trump's, it seems, were not the only failed loans on the banks portfolio, but one that was covered by the press. Washington regulators worked hard to make sure taxpayers never found out about them. After the Federal records act of 1950, it is not possible to access office of the comptroller of the currency's examination reports of individual banks. For decades now, the government's standard practice has been to warehouse individual examination reports for banks for 30 years while refusing to release them, citing exemptions under the Freedom Of Informatıon Act. After 30 years, feds then destroy the reports. The level of troubled loans at Cıtıbank that were no longer even accruing interest was nearly equal to its equity capital and its efforts to build loan loss reserves fell far short of its major bank competitors. In February of 1991, CITIBANK sold $590million of its preferred stock to Prince Alwaleed bin Talal bin Abdulaziz al Saud. Before the sale Alwaleed was the bank's largest stockholder with 4.1% stake in common stock, 11% after. A few weeks later, the bank raised an additional $600million from 3 dozen institutional investors. More than 60 years after Senator Carter Glass blamed Charles Mitchell for the GREAT CRASH and persuaded congress that CITY BNK had to be separated from Wall Street, CITI BANK and Wall Street were united. On April 6, 1998 Cıtıcorp and Travelers Group announced their merger, the stocks of both companies rallied. America's global bank for consumers and businesses was joining with TRAVELERS conglomerate that included insurance, mutual funds, and Solomon Smıth Barney, the İnvestment Bank. The merger's business model was not exactly legal. In spite of the regulators poked holes in Glass-Steagall barriers between commercial and investment banking, enough of the old restrictions remained that a full melding of the new company's various financial businesses would require a change in the law. A new law that allowed financial supermarkets had to be written, ironically CITIGROUP was asking Washington to rewrite the law that Congress had specifically written in 1933 in response to the Cıty Bank's earlier troubles. In 1999, Clinton signed the rewrite. 98 years after Frank Vandelip, Assistant Secretary, left TREASURY and few months later joined Cıty Bank, Robert Rubin, Treasury Secretary, left treasury and few months later joined CITIGROUP. Roughly 80 years after Senator Carter Glass claimed CITY BANK's Charles Mitchell for the GREAT CRASH of 1929, another federal official was suggesting the same bank may have been responsible for the historic taxpayer-backed rescue of 2008. A Robert Rubin protégé from Clinton era joined CITIGROUP to serve as chief operating officer of Cıtı alternatıve ınvestments unıt that imploded during financial crisis. In 2013 Jack Lew became Obama's secretary of US TREASURY. Jack Lew succeeded SECRETARY OF TREASURY, Timothy Geithner, who, during the financial crisis years, was the chief regulator responsible for overseeing CITIGROUP when he was at Federal Reserve Bank Of New York. Plus ca change, plus c'est la meme chose. There is much more to any system of managerial process than meets the eye by studying the charts of organizations which are intended to represent the structure of organizations. The impressive thing about the organization of national environment of corporations, although not unique to them, is the extent to which rationality is expected, encouraged, and even enforced. Substantial resources are devoted to developing information and to the discussion of its implications for action. Where rationality becomes institutionalized, that is, becomes a socially sanctioned rule of conduct, the legally prescribed institutional structure and performance that specify how actions and interactions ought to be are important elements that cannot be overlooked. But actual alternatives of managerial styles are affected by all sorts of other factors. These are the necessities of economics with linkages to the political and social system. The motivations and the habits of the decision makers of the corporations are also influenced by their personal, unique situations - the precise points in their bureaucracies at which they find themselves. Yet there have been demonstrable periodic regularities in the ways they were managed, as there have been differences in the ways they were run when their habitat changed from Fınancıal Capıtalısm (The Great Depression], to Managerıal Capıtalısm, (New Deal – Thatcher-Reagan Liberalism], and then to Asset Manager Capıtalısm I(1980s – 2008 The Great Financial Crisis]. Asset Manager Capıtalısm II and State Capıtalısm (2008-].

7.Managerial dictatorship or market chaos or network or all

Paul Seabright in the company of strangers: a natural hıstory of economıc lıfe explains how the shirt he bought in New York had its cotton grown in India from seeds developed in the United States; the artificial fiber in the thread came from Portugal and the material in the dyes from at least 6 other countries; its collar linings came from Brazil and the machinery for weaving, cutting, and sewing from Germany; the shirt itself was made up in Malaysia. The project of making a shirt and delivering to Paul Seabright in New York has been a long time in planning, since well before two winters ago when an Indian farmer outside of coimbatore planted the seeds he bought from the Monsanto's distributor. Engineers in Cologne and chemists in Birmingham were involved in the preparation many years ago. A marvel of global production with no authority in charge. The firms that make up the many links in different countries with different legal infrastructures in the chain that supplied the shirt at point of purchase had merely obeyed market prices. "The organizational basis of markets is a free exchange of value between independent actors. This exchange can only survive under law that gives the actors property rights and binds them to agreements made in contracts of buying and selling. In a hierarchy, actors are no longer independent. They are employed and become part of a relationship between employers and employed. They are dependent on each other. In networks, actors make agreements and more or less freely engage in associations. They cooperate on the basis of complementary strengths and they become interdependent. After the industrial revolution, independent producers (farmers, craftsmen) and traders were increasingly subsumed under a wage condition in the ever larger hierarchies of corporations and government agencies. I communist societies, this was even the rule for everybody. The rise of networks as an economic form entails that more and more actors become semi- independent as they have both an employment relationship and their own business. Clear examples are freelance workers, semi-autonomous professionals and subcontracting firms. The primary goal of the market form of economic organization is to make profits. The means of organization for this goal are profitable prices. Hierarchies are forms of organization that have departed from this goal in the general social division of labour in order to assure a particular organizational or social goal. Their familiar names are management and government. Here, the actual goals of the actors engaged shift to their own personal advancement in the organization, that is to say, their careers. Their actions are not ruled by prices, but by organizational routines. The rise of networks fulfills the growing need to achieve common goals in a division of labour that has gone very far. However, this is not realized by the invisible hand of the market and its prices, not by the visible

hand of management and its routines, but by reciprocal gains to be achieved in conscious agreements of independent actors and their relationships." "The modern capitalist economy is a mixture of strategic alliances, federations, oligopolies, and even monopolies on the one side and heavy competition on the other. The free market of independent producers and traders manufacturing and exchanging a single product all by themselves has ceased to exist, if it has ever existed. Production and trade have become parts of an extensive value chain that requires a sharp division of labour and the smooth cooperation of all those concerned. Competition only exists in sections of this value chain, most often sections close to consumers. Auctions, stock markets and all kinds or retail markets are still highly competitive. However, the large chains of production and distribution are ruled by strategic alliances and division of labour based on cooperation in relations of contracting and subcontracting. The multiplication of networks between and inside corporations have contributed to this trend. All organizational forms require both control and coordination. In markets, control is achieved by contracts, and coordination is realized by prices. Both are horizontal as, in principle, all actors are equal. However, they do involve transaction costs in exchange. Historically, the hierarchy of corporations and government departments has traded transaction costs between actors on the market for coordination costs within these organizations. The visible hand of management supplants the invisible hand of the market in coordinating supply and demand. In hierarchies, management attempts control by command, authority and supervision. This often means centralization of decision-making. Coordination is achieved by formalization, standardization and specialization of tasks in a sharp division of labour. The resources of the organization and the skills and time of employees are allocated according to fixed schemes. This combination of vertical control and coordination is called bureaucracy." The metaphor of the pin made famous by Adam Smith does not have a single maker, but 25 persons involved, all collaborating without a central planner, a collaboration the mainstay of 18th and 19th century classical and classical economic theory. But, the economists of the day failed to shed light on the question of why some activities were directed by market forces and others by firms, and what the determinants of an economy's infrastructural organization were. According to Coase, "Firms are a response to the high cost of using markets, transaction costs". So he wrote in 1937. Instead of negotiating and enforcing separate contracts for every transaction, it, generally, costs less to manage tasks by fiat. In markets for standardized goods and services such "transaction costs" are low, argued Ronald Coase. A well-defined task can easily be put out to the market, out-sourced, where a contractor is contracted and paid an agreed sum for doing it. The firm comes into its own when simple contracts of this kind will not suffice. Alternatively, an employee is contracted to follow varied and changing instructions, up to agreed limits, for a contractually agreed salary. Thus, the hierarchical authority structure of the firm trumps the invisible hand of the market. "Firms exist to reduce the cost to the individuals of doing business separately. His argument is that people organize production in firms when the transaction costs of coordinating production through market exchange are greater than internalizing them within the firm. The costs of transacting in markets include discovering relevant prices, negotiating and writing enforceable contracts, and haggling about the division of the surplus. What gives rise to transaction costs is incomplete information about relevant prices and costs of monitoring and enforcing good performance. It is because production has a time-element that production transactions are not typically like those which take place in a fruit and vegetable market, where both buyer and seller know the prices of all products. Within the firm, market transactions are replaced by the authority of the manager who directs the activity of all the productive units. Coase's theory also neatly answers the question of what determines a firm's size. The optimum size of the firm is reached at the point where internalizing an additional cost equals the cost of making the transaction on the market. Coase's theorem is a good example of the power of neoclassical economics to absorb apparently incongruous elements of analysis. Individuals lack complete information, but by its control over internal costs, the firm acquires it. So the assumption of profit maximization can be retained: in setting up firms' owners (share-holders) cede technical authority to managers to maximize profits on their behalf. Though somewhat of an intruder on the map of individual maximization, the firm fulfils the neoclassical criterion of rational choice.". With the advance of platform corporation, the boundary between the firm and the market might appear to be dissolving altogether. The share of self-employed contractors in the global labor force has risen. In the "gig economy" exemplified by UBER (DIDI in China) drivers are mushrooming. Open Applıcatıon Programıng Interfaces, enable organizations to offer access to their platforms without taking enormous risks or offering much in the way of support. Multiple players participate in a broadly open ecosystem of developing, using, and refining computer applications as well as data that flow between them. From the perspective of those who develop on these platforms, API can provide important shortcuts that can help to avoid reinventing the wheel on the way towards offering customers breakthrough product, but running the risk that the organization offering the platform service (Facebook, Apple, Mırosoft, et.al) might unexpectedly pull the rug out from under them. The promises of this emerging ecosystem by Ai empowered machines, platforms and crowds are tremendous, but the full implications of this inter-reliance remain to be seen. The global business systems turbo charged by CHIMERICA and lesser degree by the other members of BRICS (Brazil, Russia, India, South Africa) are changing the global ecosystem fast as the rich, the emerging and the poor societies move deeper into the information economy. But in this 21st century chaos lies opportunities that will shape how employees-employers, customers-suppliers are going to relate to each other, and the epistemology of neoclassical economics does not help. Big data & computer technology have lowered information costs so muchthat billions of individuals can now transact with each other directly 'on line'without the need for institutional intermediaries. Some even forecast that the 'knowledge economy' is bound to generate a decentralized world of small firms wired into the global networks, thus denying the existence of Google, Amazon, Apple, Facebook that have established quasi-monopolies in gathering data on consumer tastes, preferences, capabilities. These monoliths are watching us, but their surveillance is not on the radar screens of neoclassical economists entranced by their vision of and individualist trading utopia. The idea behind open innovation is as simple as powerful. The creators of new ideas do not have to be within your organization in order to be helpful. Recent advances in IT have made the frictionless sharing of experiences and lawyer-free integration of platforms possible. Yet firms have not withered away in globalized 21st century, and in President Trump's version. Managerial dictatorship of the firm with differing institutional arrangements between the firm's "stakeholders" (its customers, suppliers, creditors, CEO and staff, employees, investors, sovereign governments, international institutions (IMF, World Bank, BIS, WTO, NAFTA, EU) and the very visible as well as the textbook-invisible hand of the market chaotically co-exist, for now. Nick Srnicel in platform capıtalısm (Srnicel, 2017)[1] offers an overview of the emerging landscape by presenting five different types of platforms: advertısıng platforms (e.g. Google, Facebook) which extract information on users, undertake analysis, and the use the products of that process to sell ad space; cloud platforms (e.g. AWS) which owns hardware and software of digital dependent businesses and are renting them out as needed; ındustrıal platforms (e.g. GE, sıemens) which build the hardware and software necessary to transform traditional manufacturing into internet-connected processes that lower the costs of production and transform goods into services; product platforms (e.g. Rolls Royce, Spotıfy) which generate revenue by using other platforms to transform a traditional good into a service and by collecting rent or subscription fees on them; and lean platforms; (e.g. UBER, Airbnb) which attempt to reduce their ownership of assets to a minimum and to profit by reducing costs as much as possible. These analytical divisions can and often do run together within any one firm. Artificial intelligence is barging its way into business. Firms of all types are harnessing Ai to forecast demand, hire workers and deal with customers. In 2017, companies spent $22billion on Ai related mergers and acquisitions. Even after 2008 financial catastrophe, it is still fashionable to do it in the financial markets rather than in R&D shops. Regardless of how it is acquired, Ai is not only changing how the work place is managed, but the managerial process itself. Amazon has a patented a wrist-band designed to tract the hand movements of warehouse workers that uses Ai guided vibrations to nudge employees into making the "right" moves and eliminate the "wrong", and resultantly make warehouse workers more efficient. Frederıck Taylor would have approved. Another software company, workday, crunches around 60 factors to predict which employees will leave the company by collecting and analyzing 60 factors, such as pay, time between holidays taken and turnover in managers to whom the employee reports, and flags those at risk of quitting and for-warning Human Resource departments. Still another startup, humanyze, sells smart ID badges that can tract employees around the office and reveal how well they interact with their colleagues. ID badges the size of a credit card and depth of a book of matches are strapped on employees' wrists to collect data to be analyzed. The ID badges contain a microphone that picks up employees' conversations with each other; bluetooth and infrared sensors are to monitor employees' locations; and an accelerometer records when they move. Ai makes ubiquitous surveillance worthwhile, because every bit of data is potentially valuable for data analytıcs. The idea behind the project is not panoptic or scrutiny according to the founders' description. So, they claim. The revenue of HUMANYZE come not only from sales of hardware and software but from the use of data their badges generate for HUMANYZE. Alex Pentland, the director of human dynamıcs lab within MIT's MEDIA LAB, the godfather of wearables, especially Google Glass, the author of socıal physıcs: how socıal networks can make us smarter[1], and honest sıgnals: how they shape

our world[1] and his students have spent last two decades inventing instruments and methods that can transform all of human behavior, especially social behavior, into highly predictive math. One result was to introduce the socıometer, a wearable sensor that combines a microphone, accelerometer, Bluetooth connection, analytic software, and machine learning techniques designed to infer the structure and dynamic relationships in human groups. Pentland and his teams have worked to crack the code on the instrumentation and instrumentation of social processes in the name of a totalistic social vision founded on a comprehensive means of behavior modification. In 2010, Pentland founded socıometrıc solutıons to apply the rigors of his SOCIAL PHYSICS to captive populations of office workers. By 2015, the company rebranded itself: Humanyze. Its technology is described as a platform that uses a "smart employee badge to collect employee behavioral data, which it links to specific metrics with the goal of improving business performance. Ben Waber, its ceo, portrays the company's work as money ball for business enabling any organization to manage its employees like sports team based on measures that reveal how people move through the day, with whom they interact, their tone of voice, if they lean into listen, their position in the social network across a variety of office situations, and much more, all of it to produce 40 separate measures that are then integrated with a "business metric dashboard" in people analytıcs: how socıal sensıng technology wıll transform busıness and what ıt tells us about the future of work. An artificial intelligence enhanced video-interview service, HireView, video-interviews candidates as HireView's Ai program analyzes the facial expressions, body postures and the verbal skills, intonation and gestures of the candidates. Such machine-sorting can be helpful for companies that recruit globally when candidates are from different cultures or speak another first language, but with the worrisome possibility of rejecting the wrong candidate. Video-interview is the first step of the recruitment process in HireView, only when applicants pass the video-interview they meet some humans of the Human Resources Departments. Another recruitment service company, Pymetrıcs, helps to develop data about candidates without conventional qualifications by providing games that ignore factors such as gender, race and level of education for candidates to play. The candidates are also tested for some 80 traits such as memory and attitude to risk. Pymetrıcs then uses machine learning to measure applicants against top performers and predict their suitability for a role. Pymetrıcs aims to helps the recruiter to identify employable among candidates without conventional qualifications. In another start-up, Cognıto's Ai-enhanced software listens to customer-service calls and assigns an "empathy score" based on call centers' agent's compassion and capability in settling complaints. Among employee surveillance startups, Verıato, goes so far as to track and log every keystroke an employee makes on his computer in order to gauge employee's commitment to the company. VERIATO's software searches for signals that may indicate poor productivity and malicious activity, like stealing company records, and scans e-mails to gauge how employee's sentiment changes over time. Companies can use services offered by SLACK to sift through not just employees' professional communications but their social-media profiles too. SLACK stands for searchable log of all conversation and knowledge. Ai and Data analytıcs empowered employee surveillance systems are changing the work environment, redefining the rights and obligations of employees and employers. Few laws exist to govern how data are to be collected at work, and many employees unguardedly consent to surveillance when they sign their employment contract. The emerging work environment of the 21st century is beginning to look very different from the 20th. So far, managerial authority seems to be the expanding its sphere of control at the expense of reduced sphere of decision options of the employees. At Mıcrosoft employees can track their own movements with MyAnalytics, a program which puts together data from e-mails, calendars and show employees how they spend their time, how often they are in touch with key contacts and whether they multitask too much. MyAnalytics is a feedback tool provided to the employee mainly for self-help, it is not designed as a surveillance tool to enhance managerial control mechanism. MyAnalytics also aggregates the data and offers the summaries to the employees to help them manage their departments and see how their teams are doing. Amazon has an in-house Optımızatıon Squad, a unit that writes algorithms Amazon uses to constantly streamline its own operations. In AMAZON's fulfilment centers, vast warehouses more than 100 in North America and 60-odd around the world, the packages move on conveyor belts at the speed of an escalator in a shopping mall. The deafening noise of the facility is matched by conspicuous lack of humans. There are, instead, thousands of yellow 6 feet tall cuboid shelving units inside a fenced-off area, the size of a football field. In Amazon's vernacular, they are "pods". These pod are shuffled by hundreds of robots in and out of neat rows by sliding beneath the pods and dragging them around. Associates, human workers in AMAZON's terminology, are assigned to stations at gaps in the fence that surrounds this 'robot field'. Some of the associates pick items out of pods brought to the by a robot, others pack items into empty pods, to be whirred away and stored. For the system to keep track, the associates pick or place an item, scan the product and the relevant shelf with a bar-code reader. To minimize the down-time of human workers and have faster flow of goods through the warehouse, the amount of down-time human workers has to wait before a robot drags a pod to their station need to be shorter and fewer. Optimization squad for fulfilment centers are developing these algorithms for robots. AMAZON has an Ai body-tracking system pilot project that AMAZON refers as NIKE INTENT DETECTION which is to track what the associates pick and place on shelves to get rid of the hand-held bar-code reader. Such manual scanning by the associates takes time that can be saved if the cameras can keep track. What AMAZON GO is to do for shoppers, NIKE INTENT DETECTION is to do it for fulfilment associates. It is to track what they pick and place on shelves. AMAZON's algorithmic venture, a cashier-free grocery, AMAZON GO, that watches shoppers with a bank of hundreds of cameras converting visual data into a 3D profile that track hands and arms as they handle a product. AMAZON GO records which items shoppers pick up and bills them to their AMAZON account when they leave the store. Platform companies' reality can best be understood by deciphering the hidden DNA of AMAZON, APPLE, FACEBOOK, and GOOGLE (ALPHABET), the American disruptors, and their Chinese counterparts, ALIBABA, BAIDU, TENCENT, XIAOMI, HUAWEI, ZTE, OPPO, LENOVO, HAIER to understand how they are changing the rules of business. FACEBOOK and GOOGLE suck up two-thirds of America's on line ad revenues. AMAZON controls more than 40% of the country's booming online shopping market. In some countries GOOGLE processes 90% of web searches. Not only is the message but the platform is also the market. Just as electricity enabled the assembly line in the 19th century, since machines no longer had to be grouped around a central steam engine, data analytics companies promise to usher in the assembly lines of digital economy, distributing data-crunching capacity where it is needed. They may also help all kinds of firms create the same network effects behind the rise of the tech giants. The better they serve their customers, the more data they collect, which in turn improves their capacity. Globally, according to PitchBook, a research company, there are 35 startups in data analytics in 2019. Most of these firms claim of having conjured up Ai platforms. Only a few of them meet the generally accepted definition of "platform", typically reserved for APPLE's and GOOGLE's smartphone operating systems which allow developers to build compatible apps easily. An Ai platform is expected to automatically translate raw data into an algorithm-friendly format and offer a set of software design tools that enable people with limited coding skills to use. Many of the 35 data analytics companies including the biggest, PALANTIR, sell high-end customized services by building an operating system from scratch for every client. Whereas, Amazon Web Servıces, Mıcrosoft Azure and Google Cloud offer standardized products for their corporate customers. Among the 35 startups, 3C.ai and DataBricks stand out. DataBricks was founded by the group that developed APACHE SPARK, an open-source program which can handle reams of data from sensors and other connected devices in real time. DataBricks expanded APACHE SPARK to handle more data types. In 2019, it sells its services to Hotels.com and VIACOM. Born of abstruse computer science, DataBricks helps clients deploy open-source tools effectively. 3C.ai on the other hand, like most enterprise-software firms sell proprietary applications. 3M employs 3C.ai software to pick out potentially contentious invoices to pre-empt complaints. The United States Air Force uses it to work out which parts of an aircraft are likely to fail soon. It is unclear which one will prevail. The gig economy is assembling a reserve force of atomized laborers who wait to be summoned, via electronic foremen, to deliver people's food, clean their houses or act as their chauffeurs. The 21st century lumpen proletariat, some say. Figures from the BUREAU OF LABOR STATISTICS, released on June 7, 2018 show that group of American workers to be only 10.1% of the employed. Not an alarming figure supporting the much heralded decline of the conventional jobs in recent years caused by disruptive platform companies. "While Beijing and D.C. move to reassert national interests on the technology industry, private companies are taking the battle overseas. After years of running into brick walls in each other's home markets, leading companies from China and the US are now fighting it out in places like Brazil and India, where hundreds of millions of people are coming on line for the first time. The result is a series of private sector skirmishes that can be seen as proxies for the influence of each country's technology ecosystem." Writes Matt Sheehan in the transpacıfic experıment: how chına and calıfornıa collaborate and compete for our future (Sheehan, 2019). and adds, "American and Chinese tech companies are taking two different approaches to this proxy competition. U.S. technology firms tend to go it alone: when they enter a foreign market, they bring their home product and their home brand to the country. They seek to beat the local competition and win the entire market for themselves. Chinese firms have instead largely chosen to back a leading local start-up

ineach market: investing and sharing technology with the companies trying to drive out the American juggernauts. If the local start-ups win, the Chinese company will get a percentage of the spoils via their stake and also have an ally in charge of a key market. It's a strategic divide born out of the U.S. and Chinese tech companies' divergent histories. Early U.S. tech companies largely romped across global markets (except China), and they assumed that American dominance will continue. For the Chinese companies, their defining battle was the fight on their home turf against these foreign companies, a contest that drove home the advantages a scrappy local start-up can have over a global juggernaut." (Sheehan, 2019).

As with its Great Firewall, China was able to prevent American firms from taking on Chinese rivals in China, and Chinese companies were kept out of America, Europe fell under the spell of Silicon Valley before Chinese tech had matured. APPLE was an exception to flourish in China. But now, ALIBABA is taking on AMAZON, BAIDU is matched against GOOGLE, and TENCENT is to prove its technological superiority against FACEBOOK. They have very different strategies, however. American firms typically set up outposts firm from scratch. They fund subsidiaries that offer much of the same service to Indians or Mexicans as their domestic users might expect. One-size-fits-all.

ALIBABA's strategy in emerging markets, on the other hand, has been not to set up shop itself, but instead to invest in local companies. ALIBABA's partners include PAYTM and BIGBASKET in India, TOKOPEDIA in Indonesia, LAZADA in Singapore, DARAZ in Pakistan, TRENDYOL in Turkey. Since GOOGLE and FACEBOOK earn bulk of their revenue from advertising, and therefore, there is less incentive to localize, and furthermore, their optimization algorithms reflecting factor scarcities of America make little efficiency sense in emerging markets' price priorities. Chinese firms' competitive advantage, by contrast, has come from being able to process payments and organize distribution of goods in a country where doing such things had previously been tricky. "One size fits all" solutions are hard to implement. Partnership with local entrepreneurs is the Chinese customized strategy.

The annual conferences of AMAZON, FACEBOOK and GOOGLE held to announce new tools, features, and acquisitions, send shock waves of fear through venture capitalists and entrepreneurs of Silicon Valley. Venture capitalists attend to see which of their companies are going to fall in "kill-zone" around the giants. Tech giants try to squash startups by copying them, or they pay to scoop them up early to eliminate a threat. The idea of a kill-zone may bring to mind MICROSOFT's long reign in the 1990s, as it embraced a strategy of "embrace, extend, and extinguish" and tried to intimidate startups from entering its domain. But entrepreneurs' and venture capitalists' concerns are striking because for a long while afterwards, startups had free rein.

Venture capitalists are wary of backing startups in online search, social media, and e-commerce. The wariness comes from seeing what happens to startups when they enter the kill-zone, either deliberately or accidentally. Amazon's cloud service, AMAZON WEB SERVICES, (AWS), have labelled many startups as "partners", only to copy their functionality and offer them as a cheap or free service. A giant pushing into startup's territory, while controlling the platform that startup depends on for distribution, makes life tricky. The KRONOS EFFECT is the efforts undertaken by a dominant company to consume its potential successors in their infancy. Understanding this effect is critical to understanding the cycle of from open to closed system, from a freely accessible channel to one strictly controlled by a single corporation or cartel.

By 2017, FACEBOOK managed, unchallenged by ANTITRUST authorities, 67 acquisitions, AMAZON undertook 91 and GOOGLE got away with 214. In this way, the tech industry became essentially composed of just a few giant trusts as their competitors became marginalized with every passing day says Tim Wu in The Curse Of Bıgness: Antıtrust In The New Age (Wu, 2018). The monopolistic structure that typified the 20th century information industry found its footing on the Internet when APPLE while it had always wavered on openness, committed itself to work exclusively on the network of AT&T, to a set of ideals well aligned with the interests of the faltering old media, the entertainment conglomerates, and newspaper magnates like Rupert Murdoch. While a difficult partner in many respects, APPLE provided the old monopolistic firms a rejuvenation at last via the Internet through the great promise of the iPAD. Combination of Apple, AT&T and entertainment conglomerates was welcome after the spectacular failure of AOL and TIME WARNER merger. As APPLE befriended the old monopolistic media, GOOGLE remained the de facto leader of a different coalition that depended on the WWW and an open INTERNET when the early 21st century dream of vertically integrated MICROSOFT-GE, AOL TIME WARNER, and COMCAST-DISNEY fell apart. In China, fewer and fewer tech startup companies are able to escape the radar screens of BAIDU's, ALIBABA's and TENCENT's investment groups on the look-out for potential winners. In 2019, BAT as the tech triumvirate is known, has already invested, directly or indirectly, in more than half of the 124 startups counted as "unicorns" (those worth $1billion or more) according to IT JUZI, a database of startups in Beijing reports The ECONOMIST[1]. By the time firms hit the $5billion mark, over 80% have taken a form of BAT investment. The KRONOS EFFECT with Chinese letters. Of the three, two are bigger. Even after declines in tech stock prices in the third quarter of 2018, ALIBABA and TENCENT are still worth close to half a trillion dollars. Lately, both have moved out of their core business into areas as varied as financial services, bike-sharing, ride-haling and food delivery, clashing along the way. Gracefully maturing and increasingly powerful, they are ruthlessly blocking and tackling not only each other, but any firm that sides with the enemy, and not only in China anymore.

To the Chinese, the scene of American venture capital firms may seem familiar, a scaled down version of the Chinese scenario. "Kill-zone" is the metaphor that describes acquisitive investment strategies of technology giants, AMAZON, FACEBOOK and GOOGLE, in acquiring startups particularly in consumer-internet products. According to McKINSEY, a consultant, America's giants make just 5% of all domestic venture capital investments, whereas BAT account for close to half of those in China. TENCENT has a portfolio of 600 stake-holdings acquired during 2012-2017. ALIBABA and TENCENT are offering more than just large checks. They offer their platforms. TENCENT's WeChat counts over 1billion users. ALIBABA's emporia are home to 1million merchants. Through WeChat PAY and ALIPAY, their competing payment systems, ALIBABA and TENCENT account for 94% of mobile transactions. Venture capitalists, in the United States, shy away from backing startups whose business centers on the consumer-internet, when the preferences of GOOGLE and FACEBOOK are conspicuously evident. In China, however, that is not yet the case, because of sufficient availability of early-round financing. Many Chinese venture capitalists' strategy is try to identify the sparkiest startups, anticipating generous sell-out later when the giant steps in to buy. When TENCENT invested $600million in MOBIKE, a shared-bike startup in 2017, ALIBABA countered with a $700million stake in a rival OFO, forcing dozens of smaller competitors out of the race, but richly rewarding those venture capitalists that provided early-round financing for MOBIKE and OFO. The government is unlikely to break up the "walled gardens" that giants have built around their offerings, in which startups must also operate so long as the giants follow the government's directives in directing its knowhow according to the state's industrial plans.

The narrow profit maximizing efficiency focus of corporations has inspired the launch of an OPEN SOURCE CIRCULAR ECONOMY movement. Its worldwide network of innovators, designers and activists aims to follow in the footsteps of open-source software by creating the knowledge commons needed to unleash the full potential of circular manufacturing. The full regenerative potential of circular production cannot be reached by individual companies seeking to make it all within their own factory walls. If every tractor, refrigerator and laptop manufacturer attempts to recover, refurbish and resell all and only its own brand of products within proprietary cycle of material flow. The system wide regenerative potential cannot be achieved.

The movement has been driven by four principles: the open-source sharing of new inventions, the promotion of a collaborative learning culture, a belief in community self-sufficiency, and a commitment to sustainable production facilities. The software used to program and print physical products remains open source, allowing participants to share new ideas with one another in do-it-yourself, DIY, hobbyist networks. The open design concept conceives of the production of goods as a dynamic process in which participants learn from one another by making things together. The elimination of intellectual-property protection significantly reduces the cost of printing products, giving the 3D printing enterprise an edge over conventional manufacturing enterprises, which must factor in the cost of myriad patents. The production process is organized completely differently than the manufacturing processes of the first and second industrialization. Conventional factory manufacturing of the first and the second were a subtractive process. Raw materials are cut down and winnowed and then assembled to manufacture the final product. In the process, a significant amount of the material is wasted and never finds its way into the end product. 3D printing is additive "infofacturing". The software is directing the molten material to add layer upon layer, creating the product as a whole piece. OPEN SOURCE CIRCULAR ECONOMY movement believes that circular manufacturing must be open source because the principles behind open source design are strongest fit for the circular economy's needs. Those principles include modularity, that is making products with parts that are easy to assemble, disassemble and rearrange; open standards, that is designing components to a common shape and size; open source, that is full information on the composition of materials and how to use them; and open data, that is documenting the location and availability

of materials. In the collaborative commons, millions of innovators are defying the mainstream economic theory that without intellectual property protection innovators, not being able to recoup their costs, will not bring new products to market. They are co-creating and using free open-source software known as FOSS as well as free-open source hardware, FOSH. Global vıllage constructıon set demonstrates step-by-step how to build from scratch 50 universally useful machines, from tractors to wind turbines. OPEN BUILDING INSTITUTE aims to make open-source designs for ecological, off-grid, affordable housing available to all.

Many WEB 3.0 projects have developed their crypto-economic models after SATOSHI MAKAMATO pointed the way. The idea is to replace a centralized firm with a decentralized network, held together by incentives created by a token – a kind of "crypto-co-operative". All those involved, including the users, are meant to have a personal stake in the enterprise and get their fair share of the value created by a protocol. The invisible hand of the market replacing "the firm". SATOSHI MAKAMATO provided the tools for the defenders of JEFFERSONIAN CAPITALISM to challenge the enshrined HAMILTONIAN centralized corporate hierarchy of managerial authoritarianism as Ai enabled HAMILTONIAN corporation incorporated the invisible hand of the market to manage its internal affairs, CROWD SOURCING, is flattening the layers of corporate hierarchy of managerial authoritarianism.

8.20th Century lessons are not "plus ca change, plus c'est la meme chose"

By the 1910s, the Unites States had surpassed the United Kingdom as the world's largest economy. The reason was largely the strength of US manufacturing companies, which accounted for approximately 50% of the country's GDP at the time. American factories were powered first by flowing water that turned waterwheels, then by steam. Around the start of the 20th century, electricity appeared as another viable option. It first gained traction as a more efficient replacement for the single big steam engine that sat in the basement of factories and supplied power to all of their machines. Electrification was one of the most disruptive technologies ever. In the first decades of the 20th century, it caused something close to mass extinction in US manufacturing industries.

Roberto Mangabeira Unger in the knowledge economy describes industrial mass production sometimes also called Fordist mass production as "the large-scale production of standardized goods and services by rigid machines and production processes, on the basis of semi-skilled labor and highly specialized and hierarchical work relations. It assembled a stable labor force in large productive units under the aegis of big or medium-sized businesses. It required of its workers' repetitious moves mirroring the moves of the rigid machines which they worked. It affirmed a stark division between supervisors and implementing responsibilities at work as well as among jobs in executing productive plans. Mass production was made possible by a series of technological, organizational, institutional and conceptual innovations: for example, steam or electrical engines, machine-cutting lathes, and metal-making, converters, a way of organizing the technical division of labor modeled on the military organizations of the historical period in which it arose; and a legal framework allowing managers to exercise, in the name of property, wide discretionary authority over the labor force. Innovations were understood and organized as episodes precipitated by events in technological invention and scientific discovery, in law and politics, or even in finance, that were external to the routines of production. They promised to raise productivity and threatened to disrupt established ways of doing business. From the outset and throughout its history mass production has been chiefly associated with one sector of the economy: industry. Mass production is formulaic It thrives on repetition and standardization, not just of products but also of processes: of ways of working and even of ways of thinking. It reserves innovation or disruption to an external or in any event a superior authority: the manager acting in the name of the owners even if the owner is the state. The requirements to establish it and to operate it may be exacting but they are also limited. Like its methods, they are stereotypical." (Roberto Mangabeira Unger, 2019). The educational requirements of mass production for ordinary workers are minimal willingness to follow orders and to understand oral or written instructions, combined with whatever physical competence the specialized task assigned to the worker may presuppose. "The job-specific and machine-specific skills needed to use rigid, dedicated machines have been the traditional concern of vocational training in the age of mass production. They place few or no demands on the acquisition of higher order capabilities. As a result, the skill and mechanical repertoire of mass production resembles a kit that can be taken from one place to another, no matter how different. In that far-away place it can be counted on reliably to generate the same results once its modest operational requirements are met. .... In services the model of mass production merged into what Max Weber had described as 'bureaucratic rationalization' whenever service provision was standardized and conducted on large scale." (Roberto Mangabeira Unger, 2019).

"Within the workplace an approach to the division of labor based on command and control closes the space for discretion and substitutes power and monitoring for trust. The repetitious character of work, mimicking the operations of rigid machines, leaves the specialized implementers of productive tasks little occasion to redefine the plan that they are charged with executing. An implicit term of employment contract – the contractual form of wage labor – is that all residual direction to direct the process of production is reserved to managers appointed by owners, within the restraints of law and collective bargaining. In the established arrangements of the market economy, the central legal devices organizing decentralized access to productive resources and opportunities are the unified property right (a legal invention of the nineteenth century) and its counterpart in contract law, the bilateral executory promise – an arm's-length deal, fully specifying the terms of a bargain that is exhausted in a single performance. Together, the unified property right and bilateral executory contract set up a regime starkly separating an area of privileged discretion, in which the right holder need take almost no account of the interests of other people – the zone of his entitlements – and a surrounding field in which he becomes subject to the claims of others. In such a world, a realm of arm's-length dealings and unchecked self-interest stands in stark contrast to every part of social life in which social interdependence is paramount: the family, the community, the church." (Roberto Mangabeira Unger, 2019).

At the start of 20th century, manufacturing industries in the United States were dominated by "industrial trusts". They were large companies born of mergers. Their owners aimed at to take advantage of scale economies in production, purchasing, distribution, and marketing. Certain trust builders also hoped to create companies so large that they would become monopolies able to set prices. A survey published in 1904 tallied more than 300 such trusts, managerial dictatorship a l'Americaine. The THIRD REICH coopted the state and the industrial cartels as the Japanese state coopted ZAIBATSUs to form uber managerial dictatorships not only to compete with Moscow's monolithic command-control system, but also quickly solve the mass misery of the great depressıon.

Consider a listing of the top American companies from about 1910 or so. It would include U.S. steel and bethlehem steel, standard oıl, and gulf, swıft armour, and general foods, at&t, general electrıc, and westınghouse, anaconda copper, and alcoa, dupont, and Amerıcan tobacco. At the time, US industrial trusts seemed positioned to reign for a long time. They were well capitalized, staffed by the first generation of professional managers, and far from hostile new technologies. They learned to communicate by telegraph and ship goods via railroad, and switched from steam to electric power in their factories. A survey in 1935 found that over 40% of the industrial trusts formed between 1888 and 1905 had failed by the early 1930s.

The great shake-up in the early 20th century American manufacturing had multiple causes, including the upheavals of WWI and President TEDDY ROOSEVELT's trust-busting crusade, but the many shocks of electrification were one of the fundamental reasons why so many top companies failed or floundered. The big gains came not from simple substitution of electric motors, but from the redesign of the production process itself that involved techno-economic paradigm shift. Except for companies from new industries, like General Motors and RCA, the listing of companies in 1970s is much the same as they were at the start of 20th century. Despite all the vicissitudes of mergers, name changes, and antitrust, the top companies in 1910 mostly held their positions for the next seventy years. The successful companies of the early 1900's had emerged from the most savagely Darwinian Industrial maelstrom in history. Rockefeller, Carnegıe, and their ilk, clawed to the top through ruthless efficiency and lethal execution. The best German or British chemical and steel companies could beat the Americans in this or that niche, but across the board the United States possessed the most formidable array of industrial power ever seen.

And then Americans slacked off. Almost as soon as US steel was born from a string of mergers in 1901, its chief, Elbert Gary, started working out market-sharing and the price maintenance agreements with his competition. US steel was born controlling more than half the market. Gary argued that if his fellow steel moguls just adopted U.S. Steel's high price structure, they would each maintain their market shares, and all could flourish together. After the standard break up in 1911, the oil industry fell into a similar pattern, and eventually so did newer industries, like automobiles and televisions. A steel company chief once explained the logic of price maintenance to a senate antitrust committee: "If we were to lower our prices, then it would be met by our competitors, and that would drop their profit, so we would still be right back to the same price, relatively." War preserved and extended Americans' hegemonies. Companies could wax fat on wartime weapons orders and post war reconstruction, and at the same time, help destroy their overseas competitors. A 1950s steel sales executive bragged, "Our salesmen don't sell steel; they allocate it." But by defanging competition, Gary's system of "administered pricing" froze technology. The locus of innovation in steel-making shifted to Europe and Japan.

In the United States, managerıal capıtalısm emerged out of the Great Depression and its set up was characterized by stable high economic growth and shared prosperity. Indeed, the 25 years following World War II were called the "Golden Age" of capitalism. Prior to the Great Depression, fınance capıtalısm prevailed in the United States. It was characterized by a small government, gold standard constrained with little regulation of banking and finance or anything else, and a growing income and wealth inequalities, essentially laissez faire capitalism. As a consequence, the economy was much more financially unstable and recorded numerous, frequent, and prolonged economic contractions.

"Franklin Roosevelt's New Deal went through three stages in it evolution between the crisis of the 1930s and the end of the Second World War. It had passed through an early period of institutional experimentation, narrowly focused, despite Roosevelt's boldness, on re-stabilization of the economy and corporatists management or containment of competition. It had suddenly narrowed its focus to the provision of antidotes to economic insecurity (of which the Social Security program came to be the iconic example). And in the astonishing episode of the war economy, it had designed, under pressure of national emergency, a radical departure from the economic arrangements and ideology that were supposedly sacrosanct in the country. It had combined this practical, untheorized, and immensely successful heresy with a massive mobilization of national resources. Once the war had ended, postwar administrations turned to what earlier stages of the New Deal's itinerary had already prefigured: the development of mass consumption as both the driver of economic growth and the most tangible practical outcome of the effort to democratize the economy on the demand side" (Unger, 2019).

From 1931, the size of government spending progressively grew and with the new deal, a new stage of capitalism progressively emerged that increasingly involved the federal government in macroeconomic and regulatory affairs, managerıal capıtalısm. Partly due to federal government's involvement in macroeconomic management, the distribution of income and wealth narrowed and real income grew across all income categories. A broad range of households benefitted from the prosperity and were able to increase and maintain their standard of living without recourse to debt. "One of the most constant doctrines of economics has been that returns to labor – the real wage – cannot sustainably increase above the rise in productivity. This dogma contains a residue of truth: a mandated rise in the returns to labor is likely to be undone by inflation. Aside from this qualification, however, we know the dogma must be false: for if we compare economies at comparable levels of development and control for different factor endowments (notably population density and wealth in natural resources), we find that there is a wide disparity in the division of national income between labor and capital. The cause of this divergence lies in the legally defined institutional arrangements that either strengthen or weaken labor in its relation to capital and shape the terms on which labor can be recruited for production. Economic growth requires repeated breakthroughs of the constraints on both supply and demand. The most long-lasting and effective ways of breaking through the constraints on demand are those that influence the primary distribution of economic advantage rather than trying to correct that distribution after the fact through progressive taxation and redistributive entitlements. The predominant arrangement for organizing and representing labor in the rich North Atlantic world and its outposts was the contractualist or collective bargaining labor-law regime: collective bargaining was designed to shore up the reality of contract in the unequal setting of the employment relation to the 'countervailing power' with which it endowed organized labor. In Latin America, an alternative, corporatist labor law emerged: workers (in the formal, legal economy that often accounted for half or less of the labor force) were automatically unionized according to their sector, under the tutelage of the ministry of labor. Both the contractualist and corporatist regimes had as their economic setting industrial mass production, with its characteristic gathering of a stable labor force in well-defined productive units (factories and others) under the aegis of business corporations. …. What has seemed to be the natural form for the representation and protection of labor may turn out in retrospect to be only a relatively brief interlude between two periods in which labor was organized primarily by means of decentralized contractual arrangements, without economic security or citizenship. Before industrial mass production and the contractualist and corporatist labor-law regimes, it was the putting-out system, which Marx described in the early parts of CAPITAL. Now, in the wake of the decline of mass production and of its overtaking by a new advanced but exclusionary practice of production – the insular or hyper-insular vanguardism of the established form of knowledge economy – another putting-out system has arisen on a global scale. Many mass-production jobs are subcontracted to low-wage firms in poorer countries. Others are replaced by insecure piece-work and temporary employment, especially in services. In the absence of an alternative legal regime for the representation and protection of labor and, more fundamentally, of initiatives that would move toward an inclusive vanguardism, labor becomes defenseless and its share in national income declines." (Roberto Mangabeira Unger, 2019).

"In the United States, the turning point in the scale of production processes had already been reached before the Second World War. Up to that time, production had been concentrated in ever larger units. Since the Second World War companies have slowly started decreasing in size, not only in the United States, but also in other western countries. This should not overshadow a second process that has been going on simultaneously: the centralization of capital and strategic control over production processes. These trends appeared in the growth of international corporations and conglomerates of financial capital, and in the tendencies towards business monopolization or oligopolization. A present-day example of the convergence of both trends is the concentration of media in the hands of tycoons such as Murdoch, Berlusconi, Malone and Bertelsmann. These people have no wish to merge the media they appropriate: on the contrary, more often they are diversifying them in order to gain a larger share of a growth market. Within companies, a network structure of functions, tasks and activities also arose. This was a fundamental transformation described variously as a movement from 'just-in-case' to 'just-in-time' production, from 'mass production' to 'flexible specialization', and from 'Fordism' to 'post-Fordism'. The first part of these distinctions refers to the modern industrial production process based on Taylorism and the system of assembly lines (Fordism) that was predominant in industrial countries until recently. Here the goal was to achieve the highest production at the greatest speed. Machines had to work for as long as possible on a single (part of a) mass product. A high level of specialization between and within divisions was prevalent. Assembly lines and other systems of transportation took care of transit. Parts, components and personnel had to be kept in store('just-in-case') to keep production going during breakdowns. However, this system, so devoted to the speed of continuous mass production, in fact suffered delays in almost every link. The linear structure had too many phases and links working at different speeds. So, numerous logistical problems were created. The structure was vulnerable to the smallest malfunction. An extensive hierarchical line structure was needed to coordinate all the processes and divisions. The more complicated the end product, the longer and more complicated the route between all the divisions. The results were long and delivery times unreliable. Only two decades ago, a (part of a) product was processes only 5% of the time it spent in the factory; 30% of production costs were used for storage, coordination and transportation inside the factory. To summarize this type of production process was characterized by optimizing partial aspects, to allow separate machines and workers to work faster. The advancing complexity of products and differentiation of demand slowed this process and reduced the growth of productivity in the 1960s. However, it took the economic crisis of the 1970s and the model of the Japanese economic system to make manufacturers face the facts. The alternative, developed in large Japanese assembly companies, optimized the production process as a whole streams in which entire products and components, all similar to each other, were produced. Of course, the phases in these streams were divided into segments too, but these segments were homogeneous and they were supported by production groups

working relatively independently. The process was not split into stations, tasks and activities, but in parallel These production groups were multifunctional; they constantly improved their work and were charged with quality control of their own products. Hence the name 'quality circles'. The number of segments was limited and they could be coordinated by a small staff 'recruited' from the quality circles themselves. In order to make this system succeed, the work done in the segments had to fit closely ('just-in-time). Waiting periods were unacceptable. Information always had to be where it was needed. Therefore, direct communication between production groups was vital. However, soon production processes became so complicated, and distances increased so much, that media networks became indispensable for the integration of all types of communication required. They were needed to integrate computer-aided manufacturing in a single cybernetic system: computer-integrated manufacturing. In turn, this system had to be connected to distribution and supply systems, office systems, personnel information systems and management information systems" (Van Dijk,2012). Most importantly, the Western capitalist world agreed that Japanese managerial capitalism must be brought under the control of the globalized finance. To bring the Japanese miracle under control, they successfully pressured Japan to sign the PLAZA ACCORD.

Prior to 1933, The Federal Reserve operated under a gold standard domestically and externally, and it was constrained in its discounting operations by the real bılls doctrıne. Gold reserve act of 1934 removed any obligation to convert U.S. currency into gold on demand, and forbade any contractual clause requiring final payment in gold. In addition, the Glass-Steagal Act of 1933 ended the Real Bılls Doctrıne by allowing any economic unit access to the dıscount wındow, and by allowing the latter to accept any type of collateral. By making the U.S. dollar an inconvertible currency domestically, and by broadening the powers of the Federal Reserve, the United States acquired more, but not full, monetary sovereignty and so acquired more financial flexibility to promote economic and financial stability. In addition to a big bank, a big government was also created through a large increase in federal expenditures and purchases. The prompt for John Maynard Keynes to formulate general theory of employment, ınterest and money, which formulated the most influential economic heresy of the 20th century, was the economic breakdown of the 1930s. Its central theme of his general theory was the way in which supply and demand may fail to adjust until they come into balance at a low level of employment and activity. Keynes proposed that in normal circumstances there is not enough effective demand from private firms and households to ensure the use of all potential resources, resources which could be brought into use by existing technology and business organization. Therefore, government policies should add to private demand, not just in a downturn, but in normal times. The governments' budgets' proper job was not to balance the governments' accounts, but to balance the nations' accounts - aggregate supply and demand - at full employment. Whether this required a budget surplus, zero balance, or deficit depended on the state of aggregate demand. In principle, therefore, the budget could be used to restrain demand as well as to increase it, with the fiscal multiplier giving a precise arithmetic estimate of both. "The first limitation of Keynes's view is that it offers a theory of a special case: one of the many ways in which supply and demand may fail to adjust, or adjust only at a diminished level of employment and activity. The special case that Keynes theorized was one violating SAY'S LAW: supply would fail to create its own demand. A failure to translate saving into productive investment (thus hoarding), made possible by inflexibility of particular price (the downward rigidity of wages, studied by Marshall and his disciple Pigou), could result in a failure to sustain aggregate demand. The effect of our unstable humors, of elation or despondency, on the disposition of liquid money balances could magnify and prolong the slump: what began as a failure of confidence might end as a decline in real economy activity for which there would be not spontaneous mechanism of correction. Government would then have to make up by fiscal policy, or direct public spending and initiative, the deficit demand and restart the economy A second limitation of Keynes's theory was its lack of structural content or institutional vision. Although intended as apostasy, it exaggerated one of the most characteristic features of the tradition of English political economy: its subordination of institutions to psychology in its preferred explanations. The key categories in Keynes's system – the preference for liquidity, the propensity to consume, and the state of long-term expectations – are all psychological. A third defect of Keynes's view results from the other two. It is an unfinished theory because because it is truncated dealing with problems that are ultimately structural without having a structural vision. It is more than a theory of how supply and demand may come into equilibrium at a level of activity that underutilizes labor and the other resources of the economy. But it is less than a theory of perennial disequilibrium in the economy – a susceptibility to breakdown that can be brought to an end." (Roberto Mangabeira Unger, 2019).

Governments could calculate the difference between potential and actual output and adjust taxes and spending accordingly. Monetary policy was to support fiscal policy. Interest rates were to be kept permanently low, their main purpose being to minimize the cost of capital and enable the government to borrow as cheaply as possible. The political implications of Keynesian policy were contentious. Conservative politicians, committed to reducing taxes, gravitated towards monetary policy as part of their long-term goal of minimizing the state's role in allocating capital, and assign the management of the business cycle to the weaker of the two possible options: the monetary policy.

FIRE (Finance, Insurance, Real Estate) was a much smaller portion of the GDP and so was consumer finance in banks' loans. Bankers did not entice households and companies to use a lot of leverage to improve their economic well-being. Bankers' profitability rested on a careful examination of creditworthiness of borrowers and the establishment of long-term recurring relationships, rather than the aggressive expansion of their market by increasing debt loads. An originate-and-hold banking model, and labor conditions promoted sustained shared prosperity. Union membership was at its peak in the United States in 1950s with about a third of the employed and a quarter of the labor force. Given its institutional characteristics, and the politico-economic environment, MANAGERIAL CAPITALISM was less prone to financial instability with the decline of economic volatility. Not only were the financial crises less numerous during the post war era but they were also milder.

The WWII had subordinated capitalism to society. Keynesianism was part of the democratic attempt to keep control over capitalist economy in peacetime. All Western governments were committed to ACTIVIST REAL OUTPUT MANAGEMENT with big differences between the kind of activism they thought was needed. Sweden practiced a form of SUPPLY-SIDE KEYNESIANISM derived from the STOCKHOLM SCHOOL. A high level of welfare spending was coupled to activate labor market measures to force up labor productivity: a policy tailor-made for a small export-economy. The French state, which emerged from the war as the nation's chief investor, had experimented with STATISM since COLBERT in the 18th century. The German post-war economic policy, on the other hand, was influenced by the FREIBURG SCHOOL that rejected both NAZISM and STATE SOCIALISM. It accepted the original liberal belief in a competitive market system, but thought that the gaps in classical thought needed to be filled not by the state budget, but by a constitutional framework. This was necessary to protect competition from distortion, see benefits equally distributed and protect markets from the encroachment of government. These ideas coalesced in ORDO-LIBERALISM and the SOCIAL MARKET ECONOMY. The independent BUNDESBANK became the monetary pillar of the new German constitution. ORDO-LIBERALISM blended with industrial co-partnership in a German version of incomes policy.

Taking the advanced countries as a whole, a Keynesian commitment to full employment was the common element in a wider mix of national compromises between right and left, capital and labor. Countercyclical policy, improved protection for labor, partial state ownership of some industries, active supply-side policy, enlarged welfare spending, indicative planning, the social market economy, short-term lending facilities through IMF were promoted in different countries as middle ways between LAISSEZ-FAIRE and central planning. In the COLD WAR era they did important political work in protecting Western societies from communism, and the success of post-war capitalism was in marked contrast to FINANCE CAPITALISM's dismal global record between WWI and WWII.

During the war, John Kenneth Galbraith had been instrumental in running the United States as centrally directed economy through controlling prices when he worked at the Office of Prıce Admınıstratıon. In Amerıcan Capıtalısm and in The New Industrıal State, he offered visions of managerıal capıtalısm that were sharply different from the visions offered by Milton Friedman and George J. Stigler of Chicago University. His main interest was to understand the ways in which institutions modify the behavior of their members: how employees internalize the "telos", end or purpose, of organizations in which

they work. For Galbraith, by its ability to modify the motives of its employees, the firm is an economic actor in its own right. John Kenneth Galbraith, by denying consumer sovereignty, differed from the neoclassical economists. He criticized the neoclassical sequence which starts with consumers to whom firms respond. His revised sequence starts with large firms which design new products and production technology. They do market research to find what is possible to sell. They have advertising and consumer finance divisions to ensure their products can be sold. Big firms internalize many market activities within themselves. All critical interests in firms need to be considered, which means that no one's maximal interest will be achieved. They need size to gain some control over uncertainty: hence the increasing concentration of production in large corporations. Firms are not maximizers of stock holders' wealth, firms behave in ways to ensure their survival. In such accounts, the organization or institution exerts an independent influence on the action of individuals. The causation does not run one-way. His analysis of non-market coordination helps to explain the seeming paradox of organizations which exist to serve the interests of their members imposing codes of behavior which seemingly fail to maximize their independent utility functions. The building blocks of Galbraith's perceptions were, in many ways, reflective of how the big oligopolistic corporations of the day were run. For example, Galbraith's argument that firms did not maximize profits but pursued goals like sales maximization, that reflected the needs of what he called the TECHNOSTRUCTURE was in line with the managerial theories of the firm of the day. But, unlike the mathematized neoclassical economists of the day, Galbraith spurned technical details and mathematical modelling, and instead chose to address general public with his words.

After the devastation of WWII, American manufacturing was in a globally dominant position. It was marked by large manufacturing plants built along FORDIST lines, with the automobile industry functioning as the paradigm. These factories were oriented towards mass production, top-down managerial control, and 'just in case' approach that demanded extra workers and inventories in case of surges in demand. The labor process was organized along TAYLORIST principles, which sought to break tasks down into smaller deskilled pieces and reorganized them in the most efficient way. The workers were gathered together in large numbers in large factories collectively represented by labor unions. Collective bargaining ensured that wages grew at a healthy pace with relatively permanent jobs, high wages, and guaranteed pensions. Meanwhile the welfare state redistributed money to those left outside the labor market.

Pre-World War II writings about management presumed managers to be completely in charge of the enterprise and knew it holistically from top to bottom, but needed to take their social duties more seriously, see how they were beholden to their fellow human beings, to society, and even more narrowly, to their customers. Most managers had worked their way through the firm, from the bottom up, as did Andrew Carnegie. This holistic style of thinking has re-emerged in the STAKEHOLDER THEORY of MANAGERIAL CAPITALISM, which sought to restore a balance between shareholders and those of the rest of the people and social institutions that interact through the firm's activities.

BIG LABOR was inducted into the system in the 1950's, with the GENERAL MOTORS formula for labor settlements. The industry price setter usually took the lead in union negotiations. Contracts would normally cover three years, and would include wage awards in line with forecasted productivity increases. Later, as inflation picked up, contracts included both the expected productivity increase plus biannual adjustments for inflation. But when productivity flattened out in the 1970's, and inflation accelerated at the same time, the companies were left with a cost problem they could not wish away.

Even contemporaries understood that the 1950's and early 1960's were something of a golden age. Most big companies became providers of pension and health benefits. For a large slice of the population, the American dream of a house with a lawn and a decent school for the kids came true. John Kenneth Galbraith's THE AFFLUENT SOCIETY (Galbraith 1960)[1] in 1960 announced that the problem of production had been solved, and that it was time to focus on "expelling pain, tension, sorrow and the ubiquitous curse of ignorance".

Labor schools for Union activists flourished in the 1950s and 1960s. Most of them were run by Catholics, many at Jesuit colleges. The big industrial unions were often two-thirds Catholic. The schools taught bargaining and organization techniques, labor law, and labor economics, while extolling the "solidarist" power-sharing arrangements characteristic of Catholic Europe. Businessmen often attended the courses. Union leaders and executives began to regard themselves as industrial statesmen.

The stakeholder theory of MANAGERIAL CAPITALISM was more than a theory of how to run a company better. It had a far-reaching social and economic implications. In sharp contrasts to Milton Friedman and Michael Jensen who advocated strongly that a company succeeds simply through profit maximization, a stakeholder view emphasized the social relationships between management and employees, between the company and the community, the quality of the products produced and so on. These relationships gave the company social goals as well as financial ones. Together they can create more sustainable 'competitive advantage'. And because value is created collectively, through investments of resources by a multitude of actors, it should be also distributed more collectively, not just to the stockholders.

In contrast to stockholder value maximization and its goal of short-term profit maximization and its marginalization of human capital and research and development of ASSET MANAGER CAPITALISM, stakeholder values of MANAGERIAL CAPITALISM saw people not just as inputs but as essential contributors who need to be nurtured. Trust was then built between workers and managers, in a process that acknowledged the vital role of workers and managers in value creation. Investing in people was an admission that employees add value.

At the business schools, the reign of the big companies was taken as part of the natural order. The hot topics of the 1950s and 1960s were organization and finance, essentially rearranging furniture within the stable multi-unit enterprises of modern MANAGERIAL CAPITALISM. There was a 1960s merger movement, but it had academic, chalk-dust smell. The idea was that if companies assembled diverse portfolios of businesses, they could smooth out their earnings cycles. Absurdly, EXXON went into office equipment, bought a circus and a department store chain.

As business administration migrated to the graduate schools, executive ranks drifted farther from the shop floor. The consistent message of management textbooks from as late as the 1970s was that FORD, GENERAL MOTORS, and DuPont had written the sacred texts of production practices in the 1920s. The most important post war developments were mathematical techniques for optimizing machine maintenance and inventories. You could work on the formulas without going near a factory. Philip Mirowski in MACHINE DREAMS: ECONOMICS BECOMES A CYBORG SCIENCE (Mirowski 2002)[1] traces the present-day predicaments of neoclassical economic theory to its intellectual reformulation and institutional restructuring at the COWLES COMMISSION and RAND CORPORATION with military funding and in the crucibles of WWII and the COLD WAR.

Philip Mirowski demonstrates that the mathematical economics of the postwar era was a complex response to the challenges of cyborg science, the attempt to unify the study of human beings and intelligent machines through John Von Neumann's GENERAL THEORY OF AUTOMATA, and Sigmund Freud's PROSTHETHIC GOD. The dream of creating machines that can think has affected social sciences. He shows that what is conventionally thought to be 'history of technology' can be integrated with the history of economic ideas, focusing on the history of the computer. His analysis combines COLD WAR history with the history of the postwar economics in America, revealing that the PAX AMERICANA had much to do with the content of such abstruse and formal doctrines as linear programming and game theory.

In 1974, Congress passed the EMPLOYMENT RETIREMENT INCOME SECURITY ACT (ERISA) to tighten the ways the retirement funds are to be invested with PRUDENT MAN RULE intended to protect pension funds from unscrupulous financiers. Instead, it ensured that the funds would be used to advance the financial communities interests for it was the financial community that determined what constituted a prudent investment. "In other words, it was the deferred wages of millions of northern unionized workers that banks and the financial community used to invest in America's major corporations that, in turn, were abandoning their unionized workforces and relocating in southern right-to-work states. Millions of unionized workers' savings were being invested in companies whose explicit policies were to eliminate their very jobs, and nobody seemed to be aware of it. .... The financial community and the global companies were using .... the workers' pension capital to relocate not only to the Sunbelt but also beyond, setting up operations around the world." (Rifkin, 2019).

When a company is ahead or is chasing another without being chased by any, there is typically no need to take evasive action. With the road ahead looking promising and no one visible in the rear-view mirror, businesses take

a forward-looking approach and emphasize finding good employees and keeping them for the long term. Consequently, seniority-based wages and lifetime employment are typical features of "the golden era", especially at successful companies, since such measures help maintain a stable and reliable work force. In the United States, IBM and other top companies did in fact have lifetime employment systems during "the golden era".

Like flightless birds on a predator-free island, Western companies had no defenses when hungry and hard-eyed Japanese competitors finally came hunting from Asia in the 1970s. It was a slaughter! Many in the West were shocked to find that Japanese cars required so little maintenance and so few repairs. The Germans may have invented the automobile, and Americans may have established the process by which it could be manufactured cheaply, but it was the Japanese who developed cars that did not break down. The arrival of Nikon F camera also came as an uber shock to the German camera industry in the late 1960s because it was so much more rugged, adaptable, easy to use and serviceable than German LEICAS and EXAKTAS, and professional photographers switched to the Japanese brands. For the first time since Industrial Revolution, the western business system found itself challenged by a formidable competitor from Asia. By 1980, for all practical purposes America no longer manufactured televisions or radios, the Germans and Japanese controlled the machine tool industry, the American steel and textile industries were a catastrophe. Even IBM's mainframe computers were being challenged powerfully by AMDAHL and FUJITSU. ZENITH, MAGNAVOX and many other well-known US companies folded under the onslaught of Japanese competition.

By the end of the 1970s, the West began losing its ability to compete with Japanese firms as the latter overtook their US and European rivals in many sectors, including home appliances, shipbuilding, steel, and automobiles. This led to stagnant income growth and disappearing job opportunities for Western workers. When Japan joined the GATT in 1963, it had many tariff and non-tariff trade barriers. In other words, while Western nations had been steadily reducing their own trade barriers, they were suddenly confronted with an upstart from Asia that still had many barriers in place. But as long as Japan's maximum tariff rates were falling as negotiated and the remaining barriers applied to all GATT members equally, GATT members who had opened their markets earlier could do little under the agreement's framework to force Japan to open its market. The same problem resurfaced when China joined the WTO in 2001.

When US-Japan trade frictions began to flare up in the 1970s, however, the exchange rate response was correct. When Japanese exports to the United States outstripped US exports to Japan, there were more Japanese exporters selling dollars and buying yen and strengthening yen. Since exchange market participants in those days were mostly exporters and importers, the dollar fell from 360yen in mid-1971 to less than 200yen in 1978 in response to widening Japanese trade surpluses with the United States.

Many US and European companies added Japanese products to their product lines or sold them through their dealership starting in the 1970s. These products carried American or European brand names but were actually made in Japan. GENERAL MOTORS bought cars from TOYOTA, FORD from MAZDA, CHRYSLER from MITSUBISHI. FORD acquired a large ownership stake in MAZDA, and CHRYSLER did the same with MITSUBISHI. In Germany, LEICAS were increasingly made with MINOLTA components, and EXAKTA and CONTAX were made entirely in Japan. Japan's emergence in the 1970s shook the US and European industrial establishments. As manufacturing workers lost their jobs, ugly trade frictions ensued between Japan and the West. While Western companies at the forefront of technology continued to do well, the disappearance of many well-paying manufacturing jobs led to worsening income inequality in Western countries. Spasmodic attempts to react to the foreign onslaught only revealed how incompetent American companies had become. During the years that Detroit was mesmerized by chrome-laden tailfins and theories of "planned obsolescence," companies like TOYOTA and VOLKSWAGEN introduced Americans to the advantages of small, well-made, fuel-efficient cars. Subcompact imports began to gain enough market share that FORD and CHEVROLET responded with small cars of their own, the PINTO and the VEGA, both introduced in 1970. When the oil price shocks hit in 1973 and small-car sales took off, the American entries were exposed as embarrassing duds. FORBES magazine later ranked them among the worst cars of all time. After SPUTNIK, all in all, Western nations' confidence that they were the world's most technically advanced economies was shattered.

After trying options from protectionism with VOLUNTARY EXPORT RESTRICTIONs and learning JAPANESE MANAGEMENT, the Western powers agreed to pressure Japan to sign the PLAZA ACCORD.

At the end of the second decade of 21st century, the average life span of a FORTUNE 500 COMPANY is around 30 years. Only 71 companies that appeared in the original FORTUNE 500 list of the biggest in 1955 were on the list in 2012. In 2019 it was reduced to 60. In 2019, in the GLOBAL 500, there were 121 companies from the United States and 129 from the People's Republic of China. American invention MBA programs should take notice.

9.The money ıllusıon

In the 1960s, the FED encouraged US banks to step up credit creation, and more euro-dollars were created, and they spilled over as foreign investment. US companies undertook large purchases of European corporations - LE DEFI AMERICAIN. In 1971, when the French realized that American corporations bought up Europe with money created by American banks, they called the United States' bluff - $35:1 Troy ounce of 24K Gold. The French sent all those dollars that had been flooding into France, and demanded that they be converted into gold.

On August 15, 1971 the United States had to suspend the convertibility of dollars into gold. The fixed exchange rate system of BRETTON WOODS collapsed and the US dollar fell sharply on world markets, and the price of gold sky-rocketed. Edmund Safra of REPUBLIC NATIONAL BANK OF NEW YORK who amassed gold at $35 an ounce became very rich. The reserve currency of the world officially became fiat money, no longer pegged to gold. The reserve currency of the world came to be created by private bank credit, debt, and eventually, derivatives securitized by debt, more derivatives securitized by securitized-debt. And banks were allowed to trade and swap a lot of debt among themselves behind closed doors assigning values to their trades as they see fit. In 2018, the nominal value of DERIVATIVES that TOO-BIG-TO-FAIL BANKS carry as assets on their balance sheets were staggering. The nominal value of all derivatives, according to BIS, stood at $639trillion.

In the 1980s, Japanese automobile manufacturing was the envy of the world. Having mastered a suite of production processes like just-in-time inventory systems, simultaneous engineering in which the design specifications of interdependent components are worked out concurrently rather than consecutively, and mutual monitoring, Japanese firms like TOYOTA and HONDA had come to epitomize the concept of a modern lean corporation. TOYOTA, in particular, was held up to the world by management experts as a shining example of brutal efficiency cohabitating with creative flexibility. The industrial behemoth that produces TOYOTA cars and trucks is a group of roughly two hundred companies integrated by their common interest in supplying the TOYOTA itself with everything from electronic components to seat covers known as the TOYOTA PRODUCTION SYSTEM.

Companies in the group routinely exchanged personnel, shared intellectual property and assisted each other at the cost of their own time and resources, all without the requirement of formal contracts or detailed record keeping. Firms like TOYOTA that rely on networks of suppliers and subcontractors have to think of their partners' profitability rather than optimize their own short-term profitability. A network (the Japanese KEIRETSU) is a team effort, the art of building and maintaining relationships, ability to attract talent are important for network's sustainability as is its bottom line. Networks also experience a kind of inertia. Their evolution is path-dependent and often irreversible, so what happens in the early stages can be critical.

Network economics is very different from the orthodox economic theory's singular, overreaching, one-size-fits-all orthodox dogma. Unification, the search for a simple and all-encompassing theory, is the Holy Grail of science. But, the network theory suggests that in economics we need a plurality of theories for different contexts. The neoclassical theory's emphasis on competition only represents half of the story, because cooperation is not only essential for survival, but necessary for path determined existence.

According to Richard A. Werner's narrative in PRINCES OF THE YEN: JAPAN'S CENTRAL BANKERS AND THE TRANSFORMATION OF THE ECONOM (Werner, 2003,2016,2018)[1], and in NEW PARADIGM IN MACROECONOMICS: SOLVING THE RIDDLE OF JAPANESE MACROECONOMIC PERFORMANCE (Werner, 2005)[1] from the time of the MONGOLS' attempt to invade Japan in the 13th century through PERRY'S BLACK SHIPS to the PLAZA AGREEMENT, changes in Japan's economic, social, and political system have happened only

three times in modern Japanese history during MEIJI PERIOD, in the late 19th century, and during WWII and Japan's defeat in 1945, and the 1989 crash and its longest and deepest recession that followed. In all three cases, crises triggered the change. And BoJ's reaction to PLAZA ACCORD triggered the last crisis. PLAZA ACCORD was a list drawn by the West signed by the Japanese.

The threat of colonization by foreign countries propelled the MEIJI REFORMS. THE GREAT DEPRESSION, the PACIFIC WAR, and the consequent defeat were the triggers for the second major mutation. The post war miracle of high growth was despite all its achievements, largely a quantitative change, one that took place within the unchanged economic and political institutions that had been put in place largely during WWII as an output-maximizing mobilized war economy. The third crisis was engineered by BoJ to implement PLAZA ACCORD's structural change agenda.

Once, when East was East and West was West, the chasm between them was not only geographical, but moral and historical too. ASIA was a term invented by Europeans to emphasize their own distinctiveness. To Kipling-era imperialists, Asian societies were backward, despotic and unchanging. By contrast, Europe had made the decisive break to pursue a scientific approach to human affairs which justified Europe's domain over other continents. Condescension was met with emulation. Since Japan's MEIJI RESTORATION in 1868, Asian modernization including the Ottoman sultans' and Russian tzars' was long a matter of copying the West, either out of admiration for Europeans or to repel them or more likely both. Asia's economic transformations since the second world war were partly shaped by the needs of Western markets.

The US occupation, officially in charge until 1952, implemented the US program of reeducation and democratization of the Japanese people. It provided Japan with a new constitution, political parties, free elections also for women, a market-oriented capitalist economic system. Mac Arthur's reforms allowed labor unions, broke up the ZAIBATSU, and introduced sweeping land reforms. It was during the war that virtually all of the characteristics of the Japanese social, economic, and political system of postwar era that later came to be called the Japanese Miracle were formed. US occupation purged the capitalist class, the owning families of ZAIBATSUs that mainly controlled their ZAIBATSU firms through holding companies which owned the majority of ZAIBATSU firms' stock. While the capitalist families disappeared from the economic landscape their large conglomerates remained and regrouped as KEIRETSU business groups. US occupation's other major change of the economic landscape was full-scale land reform that expropriated large-scale land and redistributed among peasants purging the land owning class. Having capitalist and land owning classes purged, the US occupation put KEIRETSU managers and government bureaucrats in charge of Japan. Freed of profit maximizing capitalists and maximum rent demanding landlords, Japan's bureaucracy, thanks to US occupation, managed to realize its wartime fantasy of managing entirely free from the profit oriented interests of individual ownership. The wartime vision of managers not aiming at profits, but their own goals, had become entrenched reality. And managers' aims are advanced best when the firm grows – growth for the glory of the nation. Labor's share of profits rose along with wages, and Japan came to be known as a middle-class country, with more than 90% of the population identifying themselves as such. Some Japanese proudly quipped in 1960s and 70s that Japan was how Communism was supposed to work. As Japan had to work out PLAZA ACCORD imposed structural changes, Taiwan, South Korea and later China emerged as serious competitors.

A mobilized MANAGERIAL CAPITALISM was established. Japan became a nation run by public and private bureaucrat-soldiers in the fight for economic supremacy. The stellar economic performance of Japan and the East Asian economies were not achieved through free markets, liberalization or deregulation policies advanced by neoclassical economics. As the WORLD BANK in 1993 recognized in its EAST ASIAN MIRACLE study, the EAST ASIAN success was due to government intervention in the form of clever institutional design and direct intervention in resource allocation especially in the credit markets. Ha-Joon Chang in GLOBALIZATION, ECONOMIC GROWTH AND THE ROLE OF THE STATE (Chang, 2003)[1] and in greater detail in THE EAST ASIAN DEVELOPMENT: THE MIRACLE, THE CRISIS AND THE FUTURE (Chang, 2007) presents the historical data in the economic development model he advocates.

Until the end of the 1980s, the post war Japanese economic structure was characterized by restricted and incomplete capital markets, reliance of corporate finance on bank funding, weak stockholder influence, a large number of government regulations, direct government interference in the form of guidance, a large number of formal and informal cartels, inflexible labor markets offering full-time staff at large enterprises job security, promotion based on the seniority in terms of years spent with the firm and in-house company unions. Firms could afford to maintain cross stockholdings even if stock prices fell, because Japan was using German style book value accounting. Without pressure from stockholders, firms could plan for the long term and grow fast. Book value accounting had the additional benefit that it shielded companies from unnecessary volatility due to stock market movements and contributed to overall economic stability. Japan, under American pressure, agreed to resolve growing trade surplus with the United States by pushing the yen higher with the PLAZA ACCORD of 1985. Dependent on America for security, Japan was constrained in its pushback. The PLAZA ACCORD also involved Britain, France, and West Germany. The countries announced that they wanted the dollar depreciate and intervened in currency markets to make it happen. Within a year the yen soared by nearly 50% against the dollar. The PLAZA ACCORD is best understood not as a one-off event but as a critical stage in a multi-year dispute, which ranged from agriculture to electronics. America accused Japan of stealing intellectual property and plotting to control future industries. Robert Lighthizer, America's lead negotiator against China in 2019, gained his experience in Japanese-American negotiations. Back then Japan and Germany placated President Reagan's negotiators by agreeing to strengthen yen and D-mark against the dollar, making American goods a bit more competitive. Japan, in particular, was bullied into voluntarily restricting exports of from textiles to cars. More constructively, Japanese firms opened car factories in America, bringing Japanese quality management with them. But in 2019, the Chinese were not welcome to invest in America, where they stood accused of stealing technology and threatening national security. In 1990, Japan agreed to a STRUCTURAL IMPEDIMENTS INITIATIVE. America wanted Japan to improve its competition laws, open more widely to foreign investors and weaken its conglomerates, the KEIRETSU groups. Not very different from what President Trump wanted from China.

ENDAKA, the strong yen, accompanied by the tight money policy of BoJ of the 1990s accelerated the shift of manufacturing units into Asia and promoted the opening up Japanese domestic economy to imports. The unprecedented shift of factories out of the Japan has virtually created a second Japan outside its borders. In financial year 1995, Japan produced more abroad than it exported from mainland Japan. ENDAKA, at the same time, boosted imports. A large part of imports was re-imports from Japanese factories that were offshored. The PLAZA ACCORD set Japan on a path to doom. To counter the effect of strong yen, an obvious drag on exports, Japan slashed interest rates and unleashed fiscal stimulus. These moves brought about a short lived economic rebound. But they also generated asset bubbles. Stock and land prices tripled within five years after the PLAZA ACCORD. These bubbles burst and the economy slumped, never to recover its former mojo. In nominal terms Japanese stocks are, in 2019, 40% below their peak on the final trading day of 1989. The PLAZA ACCORD did succeed in defusing tensions between the second largest economy, Japan, and America by neutering Japan as a challenger. In 2018, the Japanese were worried about income inequality as high paying manufacturing jobs have migrated to lower-wage countries. The Japanese are more concerned about the emergence of the so-called "working poor" who were once employed in manufacturing but have now been forced to take low-paying service jobs. Estimates are 20million out of a total population of 130million are living in poverty in 2019. Japan in 1990s has entered an import-led globalization phase and is reliving the West's experiences of 1970s when Japan's MANAGERIAL CAPITALISM's spectacular success was the enabler of America's ASSET MANAGER CAPITALISM. How America dealt with LE DEFI JAPONAIS has percolated into official thinking in China in the last half of the second decade of the 21st century.

The sequence of Japan's woes does seem to make for damning indictment. But a close look at each step shows that they were not preordained. One point, clear in retrospect, is that under American pressure without European support Japan overcompensated for the slowdown in exports. Within 18 months of the PLAZA ACCORD, BoJ had cut benchmark interest rates from 5% to 2.5%. It also announced a big stimulus package, increasing government spending and cutting taxes in May 1987, though by then its recovery was already under way. It did not shift gears and raise rates again until 1989, when its asset bubbles were already a few years old.

There were at least two other factors that could have led to a different outcome. Excessive stimulus, by itself, did not guarantee that Japan would suffer an asset bubble. But, BoJ's credit expansion became much more effective when it was combined with financial deregulation, which led banks to lend more to property developers and home buyers. Guided cheap credit expansion is the recipe to inflate bubbles. Greenspan must have taken notice.

The bursting of the double bubbles did not guarantee that Japan would suffer a lost decade, let alone three. A confusingly sluggish response by regulators compounded the trouble. Rather than pushing banks to raise capital as post 2008 Western regulators did, they encouraged them to go on lending to zombie firms, perhaps to share to costs of the double real and financial assets' crashes.

The domestic economy changed after the offshoring of factories and the influx of manufactured goods. In order to compete with rising imports, firms had to lower prices, reduce inefficiencies, and increase productivity. Employment practices had to change and consumer preferences had to be taken more seriously. In April 1995, double crisis of economic slump and the shock of yen at 80 yen to a dollar convinced even the conservatives that Japan had to deregulate. All the barriers against foreign firms came down. As Japan shifted its economic system to ASSET MANAGER CAPIITALISM, the center of the economy moved from main-banks to stock markets. Since mid-1994, the Japanese service sector employed more people than the manufacturing sector. Japanese MANAGERIAL CAPITALISM without capitalists had become increasingly embattled during the 1990s. The collapse of stock market bubble ensuing the credit crunch engineered by BoJ forced many companies to sell off cross stockholdings that had been created during the war, ZIBATSUs and in the postwar era, KEIRETSUs. NIKKEI 225 index closing at a twenty-year low on the last day of 2002 provided foreign investors with the opportunity to buy the ownership of Japanese companies. In March 1999, the share of stocks listed on the TOKYO STOCK EXCHANGE that were owned by foreigners reached a postwar record high of 14.1%. By March 2001, it had risen to 18.3%, a long way above the 2.8% recorded in 1978. Mark-to-market accounting was adopted by the Ministry of Finance in 2001 speeding the transformation away from the corporate governance of MANAGERIAL CAPITAISM to corporate governance of ASSET MANAGER CAPITALISM. By 2005, the corporate governance landscape was reshaped, making main-bank system history. KEIRETSU's cross stockholdings have become exception, not the rule, it was before the crash. As a result, accountability to shareholders became a reality for the first time since the 1920s. Corporate management became increasingly profit oriented and companies are run for stockholders' wealth maximization not managers' and employees' income maximization. In other EAST ASIAN countries there were close similarities, some were put in place already under Japanese colonial rule. The phenomenal growth of the Chinese economy since 1980 has also occurred without the benefits of the free market model of neoclassical economics.

The main reason why the extraordinary nature of Japan's MANAGERIAL CAPITALISM is unknown in the MBA programs these days is the a-historic and usually counterfactual approach of neoclassical economic theory. History provides data set for the scientific economists to study. Ignoring history means neglecting the facts. The peacetime war economy of Japan's MANAGERIAL CAPITALISM was highly successful, actually by many measurements the most in the world. In the 1950s and 1960s, Japan expanded continuously at double-digit growth rates. From 1960 to 1970, Japan's real GDP rose from 71.6trillion yen to 188.3trillion – up 2.6 times. Japan overtook Germany to become the second economic power in the world reducing the world's and especially American tolerance of Japan's highly successful economic system.

After 20 years of almost continuous double-digit growth, the real GDP growth suddenly contracted in 1974. The recession lasted longer and was more severe than had been anticipated. The necessary and sufficient condition for economic recovery was an increase in credit growth. Many studies concluded that Japan would not be able to maintain the historical growth rates mainly based on exports. It would have to revamp its economy. Thus, the events of the 1970s were more than a wake-up call and a test run for BANK OF JAPAN. It cannot be denied that BoJ had gained valuable experience in the mechanics of the creation and propagation of a real estate based credit boom and the collapse that must follow. To cope with the aftermath of 8/15/1971 NIXON's unilateral decision that ended the Bretton Woods fixed exchange regime, BoJ bought a lot of yen and domestic financial assets with the newly created money. Already flush in liquidity for productive projects, the firms used the increased bank loans to embark on speculative land purchases. Urban land prices jumped by more than 50% from 1972 to 1974. BoJ induced credit boom was large enough to spill over from asset markets to real economy. All this happened before the oil shock of November 1973. From mid-1980s until the end of the decade, Japanese foreign investments dominated international capital flows. Japanese long-term capital flows multiplied from a net inflow of more than $2billion in 1980 to an outflow of nearly $10billion in 1981 to reach $65billion in 1985, $132billion in 1986, and $137billion in 1987. Japan was purchasing far more assets abroad than it could afford due to its exports. To fund its international shopping spree in the 1980s, Japan actually had to borrow foreign currency. Japan created new hot money and then bought up the world. Despite the enormous capital outflow, the yen did not weaken. To the contrary, it rose 106% from 1985 to 1987. And in the West, management gurus urged business leaders to adopt Japanese techniques as the last resort to withstand LE DEFI JAPONAIS.

Japan pulled off the same strategy corporate America used in the 1950s and 1960s, when US banks excessively created dollars, Eurodollars. Corporate America used Eurodollars, hot money of the day, to buy up European companies. While the United States had the cover of the dollar standard, ($35:1 Troy ounce of 24karat gold) Japan's cover was its significant trade surpluses, which was enough to convince observers that the yen had to be strong. As the yen did not weaken, the world suffered from the biggest bout of illusion on record. The great yen illusion.

Approximately 40% of the cumulative value of Japanese overseas investments were wiped out in yen terms between January of 1985 and January of 1987. Despite the losses, Japanese investors continued to invest in sizable amounts in US and other foreign assets. This anomaly persisted over several years despite the fact that the intention of the PLAZA ACCORD – namely to strengthen the yen – was not in doubt. In 1991, as Japanese current account was heading for new record surpluses, topping $90billion, net long-term capital outflows had suddenly vanished. Japan remained a net seller of foreign assets throughout 1991. With increasing losses on their foreign investments, it had become apparent that Japanese corporations, and particular the country's financial institutions, had not invested to make profits.

"Japan's economic rise during the 1980s provides one of the best examples of exponential growth. … After growing 2.6 times during the 1970s, when the US economy endured its lost decade, NIKKEI 225 increased by 184% between January 1981 and 1986, , almost 43% in 1986, nearly 13% in 1987, almost 43% in 1988, and a further 29% in 1989. Between January 1981 and December 1989, NIKKEI 225 had more than quintupled, the performance corresponding to average annual exponential growth of 17% for the decade and 24% for its second half. Concurrently, Japan's GDP kept on growing at an annual rate surpassing 4%, as the yen's exchange rate strengthened from 238Yen/US$ in January 1980 to 143Yen/US$ by December 1989." summarized Vaclav Smil in GROWTH: FROM MICROORGANISMS TO MEGACITIES (Massachusetts Institute of Technology, 2019).

The crisis of 1990 has spelled the end of Japanese miracle model. Japan in the 21st century is again in the process of switching to a fundamentally different form of economic organization, namely, an ASSET MANAGER CAPITALISM. Few were and are aware of the fact that in 1920s Japan's economy in many ways looked a lot more like pre-GREAT DEPRESSION US economy, FINANCIAL CAPITALISM.

Transformation of Japan's economic system was no small undertaking. The war economy system internally consistent and permeated all sectors and levels of the economy and even society. It had shaped the labor market, the capital market, the corporate governance structure, the legal system and the behavior of firms, government bureaucrats, and politicians as ordinary people. To change Japan, it seemed, one need to change everything. Only if one abandoned all features of the old system would it be possible to create a different economic structure. The Japanese needed to be made conscious of the need for such a historically unprecedented transformation. They needed an unprecedented peace time crisis. Two asset bubbles and their bust. BoJ delivered them all.

10.Financialization in the age of baby boom

The complacent incompetence of American business was bad enough, but with the demographic tides they were a double whammy. Ask an economist about the 1970's plunge in American productivity, and he will point to the fall off in investment. Possibly, some executives were slothful and incompetent,

but rising inflation and interest rates made capital very expensive. On the other hand, a demographer would point to an upsurge in young workers. People in the BABY BOOM GENERATION entered their twenties in the 1970s, creating downward pressure on wages. "When workers are cheap and capital expensive, it is sensible to reduce investment." claimed orthodox economists, but the Chinese mandarins disagreed and achieved highest growth rates per annum for their economy by investing more than half of their GDP in most years in the last two decades of the 20th century. So great was the overhang of Chinese mandarins' investment strategy in manufacturing sector that by the second decade of the 21st century Chinese companies' prices have become global prices.

The baby boom illustrates the impact of marginal changes in a population cohort. Eighteen-to twenty-four-year-olds were 4.3% of the population in 1960, and 5.6% of the population in 1970, which looks like only modest change. But the total numbers of eighteen-to twenty-four-year-olds jumped by about 50%, from 7.6 million to 11.4 million, and that was utterly disruptive.

Richard A. Easterlin (2004)[1], who wrote one of the earliest and thorough analyses of the boomer phenomena, emphasized the size of a birth cohort compared to the one just before. Birth rates dropped sharply during the Depression years, so the generation of men entering the labor market in the 1950s was an unusually small one and was much in demand. The pay gap between young workers and older workers, therefore became unusually narrow, facilitating early marriage and greater economic security also made couples more willing to have children. In Easterlin's formulation, the cohort changes became self-amplifying.

Sometime in the mid-1950s, however, the amplifying mechanisms began tilting toward disruption. When the boomers reached school age, elementary schools everywhere were forced onto double and triple sessions. It was even worse in the suburbs, where schools had to be built from scratch. As they hit their teens, juvenile delinquency moved to the top of the social agenda. Struggling to cope, police forces became more selective about the behaviors that elicited an intervention, a process that Daniel Patrick Moynihan later called "defining deviance down."

When Reagan took office in 1981 and Paul Volcker launched his assault on inflation, the great American industrial firms built during the halcyon years from the 1940 to 1960s were already intrinsically vulnerable. MONETARISM would in effect, blow them apart, for the double digit interest rates Volcker and Reagan brought on in 1981 had three catastrophic effects on these sectors. First, it destroyed their export markets, sending economies in Latin America, Africa, and parts of Asia into a tailspin from which they could not recover, in some cases, for twenty years. Second, the recession destroyed, though more briefly, their home markets. Thirdly, the interest rates drove up the value of the dollar, by around 60% in relation to the U.S. trading partners.

Those who could still purchase equipment could get it at lower price from Japan or Germany, from KOMATSU or SIEMENS rather than CATERPILLAR or INTERNATIONAL HARVESTER or ALLIS-CHALMERS. The great American Industrial belt and the labor unions it housed were kicked to pieces. And the process of dismantling of the institutions of the NEW DEAL began in the United States. By the midpoint of the Reagan era, many large corporations had been bankrupted by high interest rates, the ensuing recession in 1981 and 1982, and the competitive boost that the high dollar gave to competing industries in Japan and Europe. A major reorganization of the most technologically advanced sectors took place. Technology wizards left the large integrated companies to form their own start-ups in Silicon Valley and Seattle. In the 1990s and after, what remained of some of America's once great industrial and technical firms would fall victim to new waves of financial fraud. Plainly, the great American corporation was neither permanent nor invincible. Many that taught at business schools in early 1980s in America basically decided to pretend that the demise of large corporations had its roots in bad macro management and government's regulatory interferences with the market. "Government was the cause", President REAGAN assured "not the corporations' market power". The business school mantra asserted that the presence of the Japanese and Germans on the world stage meant that there was competition after all without specifying the two systems' different structures and macro policies. Power dispersed in several directions. Some of it went to technologists, as they set off to California and Washington to establish their own independent companies, transforming the large integrated enterprises from producers to consumers of scientific and technical research. Some of it went to asset managers of hedge funds and private equity groups concentrated in Manhattan and London, who came to reassert their own standards of financial performance on large companies, at the risk of a disciplinary raid and hostile acquisition. Some of it was lost overseas, to the encroaching enterprises of Europe and Japan. Some of it devolved unto members of the chief executive class, previously subordinate in practice to the techno-structure. These four phenomena, the rise of international trade, the reassertion of financial power, the outsourcing of technological development, and the ascendance of an oligarchy in the executive class that coupled with Reagan's and Thatcher's deregulations over the last two decades of the twentieth century had dramatic effects on American corporations, on the way they are run and on their broadly declining position in the world.

The decline of national industrial corporations in the United States can be seen in part as a process of dispersion of the techno-structure's power. This occurred partly in response to growing global competition, partly following a countercoup of asset managers from the world of international finance, partly in response to a change in the organization of technology, and partly as the result of the rise of a class of oligarchs, the new CEO's who became once again an autonomous force in the life of companies they oversaw.

The high interest rates of the 1980s, cost of funds, became a predominant consideration for the survival of the enterprise. Reagan's monetarism thus made the industrial firm dependent on its source of finance. It re-established the preeminent power of financial institutions in the United States. Wall Street was put back in charge. Mutual funds sprang up, allowing ordinary baby boomers to pool resources and have access to "professional" investment managers. A constant stream of money from pension contributions and shift of savings from bank accounts to mutual funds helped investment markets to grow. A modern fund management was born, ASSET MANAGER CAPITALISM. Insurance companies reengineered themselves into wealth managers. QUANTITATIVE FINANCE was born with four key principles for fund management. Harry Markowitz's DIVERSIFICATION, Eugene Fama's EFFICIENT MARKETS, MEAN/VARIANCE which estimated risk as standard deviation or variance as measure of volatility, and William Sharpe's CAPITAL ASSETS' PRICING MODEL that concluded: "if you took more risk then you needed higher returns." Old time investors cried with joy. They had been doing CAPMs without knowing it.

Harry Markowitz's "central idea was that one should judge the risk associated with an investment portfolio by looking not just at the risk associated with each individual asset, but at the relationship between returns on different assets. If the returns on different assets move closely together – the returns are highly correlated – then there is little benefit from diversification. But if the returns are uncorrelated then adding more assets reduces the variability of the portfolio as a whole. An 'efficient portfolio' is one that minimizes the variability of the return on the portfolio for a given average rate of return. The critical insight of the portfolio approach is that risk is a property of a portfolio as a whole, and cannot be judged by simple addition of the risks associated with each element of that portfolio. Risk depends on context, and an action that is risky in one context may reduce risk in another. There is no such thing as a risky asset, only a risky collection of assets." (Kay and King, 2020). CAPM assumes that all investors hold portfolios of stocks that optimize the trade-off between risks and returns. If everyone in the market owns such portfolios, they can then be combined to create market portfolio. The risk of an individual stock is then measured relative to the theoretical market portfolio. Thus risk factor, known as beta, is then used to calculate the cost of equity, or the return that stockholders need to receive to make the risk worthwhile. The problem is that implementing CAPM is virtually impossible, because the theory assumes perfect information on company risk, an unlimited ability to sell stocks short, and the same time horizon for all investors. In addition, because risk and return profiles change, the market portfolio must be continuously upgraded which in reality involve significant transaction costs. The asset managers tend to be evaluated against S&P 500 or FTSE 100. Furthermore, evidence shows that asset managers 'chase returns' rather than optimize risk-return trade-offs in the CAPM assumes. The assumption that the market behaves like a collection of independent, perfectly informed individuals was originally adopted in order to aid computation, but has turned out to be a persistent feature of orthodox economics. In 1965, 100 years after Jevons wrote his Theory Of Polıtıcal Economy, Eugene Fama presented the Efficıent Market Hypothesıs. Echoing Jevons, Fama imagined a market where there are a large numbers of rational profit maximizers actively competing, with each trying to predict future market values of individual securities and where important current information is almost freely available to all participants.

Fama's hypothesis was that such a market would efficiently allocate resources, and allocate financial risks towards economic entities that are most able to bear them. The efficient market hypothesis also states that market mechanisms tend to self-correct and eliminate any disequilibrium such as bubbles or crashes. Fama's hypothesis has been at the core of financial regulation over the past 40 years. The 2005 BASEL ACCORD of BANK OF INTERNATIONAL SETTLEMENT emphasized market discipline and self-regulation of large banks as core pillars of international financial regulation, and still does when many regard the EFFICIENT MARKET HYPOTHESIS as a myth born of NEWTONIAN theories of equilibrium and BACHELIER's random walk.

Orthodox economics assumes the market is made up of free individuals, who interact only to maximize their own utility, and that the economy can be modelled by aggregating over these individuals. Network theory, on the other hand, instead of seeing a group of people as nothing but a collection of individuals that act independently of one another, focuses on relationships between them. Albert-Laszlo Barabasi in NETWOK SCIENCE (Cambridge University Press, 2016)[1] gives us the tools to look for such relationships. By analyzing the dynamics that occur during a period of relative economic stability, we will try to understand why and how market forces actually lead to financial instability rather than equilibrium that efficient market hypothesis professes.

Since the 19th century, the economy had been viewed as an essentially static system, which when perturbed from the outside by external events, automatically self-adjusted to get back to its optimal equilibrium. Of course there is a constant supply of news to be assimilated, so the market never quite settles, but at any single moment it is nearly in a state of perfect balance. Since news is random and unexpected, it follows that price fluctuations, too, should be random – like the toss of a dice, or a draw from a pack of cards. One could not say whether its next move would be up or down for sure. However, as Louis Bachelier argued in his 1900 dissertation THEORIE DE LA SPECULATION, the market's behavior was essentially random and it was "impossible to hope for mathematical forecasting" although it was still possible to calculate the odds using the laws of chance. If one assumed price changes were the result of many independent fluctuations, each with the same probability distribution, then they should follow the familiar normal, or bell-curve, distribution.

Mathematicians and physicists had already constructed sophisticated techniques for dealing with randomness. Application of these methods became known as ZAITEKU in Japan FINANCIAL ENGINEERING in the West. The reason we cannot predict the economy not because the market is irrational, but because it is too rational, Fama argued. Fama and Bachelier seemingly argued for very similar conclusions. Their difference was that Bachelier, 65 years earlier, saw the market as impenetrable to reason, while FAMA saw it as being itself the reason. The market was the sum total of "many intelligent participants", so its collective wisdom was greater than that of any one person. FAMA's thesis was based on empirical evidence, which showed that economic forecasters were consistently unable to predict market movements.

Benoit Mandelbrot in FRACTALS AND SCALING IN FINANCE: DISCONTINUITY, CONCENTRATION, RISK (Mandelbrot,1997)[1] and in THE (MIS)BEHAVIOR OF MARKET: A FRACTAL VIEW OF RISK, RUIN, AND REWARD (Mandelbrot,2004)[1] with R. I. Hudson in four strokes falsified the random-walk hypothesis. 1. There were more extreme price swings than random walk would predict because the data had much fatter tails than a bell-shaped curve had. 2. The extreme events were in fact quite extreme; large proportion of the total variance was explained by just a few violent price movements. 3. There appeared to be some clustering of price movements in time, a pattern punctuated equilibrium. 4. The statistics describing the data were not stationary as the random walk predicted, but changed over time. Not only did Mandelbrot falsified the random walk hypothesis, but he also proposed an alternative. Power law neatly explained the fat tails and extreme volatility of price movements that EFFICIENT MARKET HYPOTHESIS could not explain. Mandelbrot described the market prices as having fractal geometry.

David Orrell in TRUTH OR BEAUTY: SCIENCE AND THE QUEST FOR ORDER (Orrell, 2012)[1] observes: "Rational economic man reached his highest state of perfection with THE RATIONAL EXPECTATIONS THEORY of Robert Lucas. This assumed not only that market participants were rational but also that they had a perfect model of the economy in their head, in the sense that they did not make systematic errors. As with the efficient market hypothesis, the theory assumed that markets were at static equilibrium. If prices were too high or too low that would imply that people were not being rational." (Orrell, 2012). Rational Expectations does not imply that agents never make mistakes. Agents may make mistakes on occasion. But these mistakes are only random, so each agent is correct on average over time, and, at each point in time the aggregate decisions of a large pool of agents are rational.

In technical terms Lucas defined expectations as the mean of a distribution of a random variable. As the number of observations increases, the distribution resembles a bell curve, a normal distribution, and the expectation coincides with the peak of the curve, the average of the observations. Similarly, the error or random events causing these errors adhere to the bell-shaped distribution, but their mean/expectation is zero. RATIONAL EXPECTATIONS HYPOTHESIS assumes that agents are rational and equipped with the same information and preferences, and treats the economy as the outcome of the decisions of only one individual, the REPRESENTATIVE AGENT. Agents who are identical in terms of their rationality, information sets and preferences will take identical decisions. So analyzing their decisions as a group is equivalent to analyzing their independent decisions. Therefore, mathematically, instead of maximizing the sum utility functions, you just have to maximize one utility function.

Max Tegmark in OUR MATHEMATICAL UNIVERSE: MY QUEST FOR ULTIMATE NATURE OF REALITY reminds us "As neuroscientists have now studied in great detail, the information recorded by your retinas gets processed in highly complex ways and is used to continually update an elaborate model of the outside world that is stored in your brain. … Lets call this reality model your internal reality, because it's the way you subjectively perceive the external reality from the internal vantage point of your mind. This reality is internal also in the sense that it exists only internally to you: your mind feels as if it's looking at the outside world, while it's actually looking only at a reality model inside your head – which in turn is continually tracking what's outside your brain via elaborate but automatic processes that you're not consciously aware of." (Tegmark, 2014).

David Orrell points out that "The idea of rational behavior was also given a credibility boost in the 1970s by Richard Dawkins, who provided a link between genetics and natural selection. As he wrote in THE SELFISH GENE (Dawkins,1989)[1], "If you look at the way natural selection works, it seems to follow that anything that has evolved by natural selection should be selfish." We are rational, utility maximizing machines because our genes are." (Orrell,2012). An implication of this was that economic success reflected superior genes. This is the core concept of "a chicken is just an egg's way of making another egg" – the organism is just a vehicle for the genome to be replicated in the next generation, and behavior is just this wispy epiphenomenon that facilitates the replication.

This gene-centered view can be divided in two. One is that the genome (i.e., collection of all the genes, regulatory elements, and so on) is the best level to think about things. The more radical view held by Dawkins, is that the most appropriate level is that of individual genes – (i.e., selfish genes), rather than selfish genomes. Moreover, most evolution historically took place in microorganisms and has involved a process called endosymbiosis, in which species exchange components or come together to form new species. Furthermore, biological systems have a remarkable capacity for self-organization in which highly organized can emerge without any planning or selection. Complexity scientists see patterns of nature emerging from internal dynamics, rather than just natural selection. Dawkins emphasis on mutations and the survival of the fittest is consistent with the idea, going back to Democritus, that the world is determined by the random shuffling of the atoms. "Everything existing in the universe is the fruit of chance and necessity." But the random mutation and selection are clearly important drivers of evolution that does not grant them exclusivity. The difference between the mainstream reductionist approach and the complexity approach is revealing. John H. Miller and Scott E. Page in complex adaptive systems: an introduction to computational models of social life (Miller and Page, 2007)[1] state that, "At the most basic level, the field of complex systems challenges the notion that by perfectly understanding the behavior of each component part of a system we will then understand the system as a whole."(Miller and age, 2007). According to biologists the existence of any species is an accident, and its continued survival is always subject to cancellation by the all-powerful process of random mutation and natural selection as it occurs anywhere in the interdependent ecosystem. This blind process, overlong time periods, is held to explain not only the evolution of all living things from a presumed common ancestor, but also, in some versions, the spontaneous generation of the common ancestor itself from the primordial chemical soup. For human

beings in particular, random mutation and natural selection are thought to determine not only such characteristics as eye color and height, but also intelligence, consciousness, morality, and capacity for rational thought. Neo-Darwinist theory has been extrapolated from a good explanation of many facts to the universal explanation of everything. Powerful though it certainly is, the neo-Darwinist theory cannot explain consciousness and purpose.

One cannot rescue neo-Darwinist theory from the domain of purposeless and randomness by pointing to the role of natural selection. Selection may sound purposeful, but in the accepted theory of natural selection chance dominates. Random mutation provides the menu from which natural selection chooses by the criterion of the odds of surviving and reproducing in a randomly changing environment. Economists do not go to the extreme of denying the existence of purpose. Economists recognize purpose in attenuated form under the rubric of individual preferences and do not generally consider them to be illusory. However, preferences are thought to be purely subjective, so that one person's preferences are as good as another's. Purpose has not been excluded, just reduced to the level of tastes.

Kate Raworth in DOUGHNUT ECONOMICS: 7 WAYS TO THINK LIKE A 21ST CENTURY ECONOMIST (Raworth,2017) calls for replacement of HOMO ECONOMICUS with more complex portrait of human behavior: First, rather than narrowly self-interested, we are social and reciprocating. Second, in place of fixed preferences, we have fluid values. Third, instead of isolated, we are interdependent. Fourth, rather than calculate, we usually approximate. Fifth, far from having dominion over nature, we are deeply embedded in the web of life. The appropriate framework for sketching this portrait in mathematical terms seems to be quantum formalism.

The claim that investors cannot beat the market is the colloquial form of the more formal EFFICIENT MARKET HYPOTHESIS, (EMH). This hypothesis like most tenets modern financial theory, is only loosely related to reality, yet hold a powerful sway over academic economists and Wall Street. EMH claims that markets are highly efficient at incorporating new information into prices. If a company announces disappointing earnings, the market instantaneously marks down that company's stock price to reflect the new earnings outlook. It is simply the case that a single investor cannot benefit from the news in ways that beat other investors. An investor can win or lose, but cannot outperform. If markets were efficient at incorporating new information as the hypothesis requires, there would be no flash crashes, panics, manias, or bubbles. Yet those events happen. On March 12, 2020, the drop in stock markets in New York was a match to BLACK MONDAY of 1987 in spite of FED $500billion injection to the REPO markets.

EMH exists in so-called weak, semi-strong and strong forms. The weak form tests our ability to beat the market using historical prices and returns only. Few analysts confine themselves to so little information. Research just outside these narrow bounds should produce superior returns. The semi-strong form takes into account historical prices and returns plus all public information. That sets a high bar for investors who try to outperform. The strong form includes all information, historical, public, and private. Yet no single investor could possibly have all the private information. That is what makes it private.

The main problem with EFFICIENT MARKET HYPOTHESIS is the notion of "intrinsic value". The theory was born out of the neoclassical belief that the economy has some kind of stable equilibrium – a unique set of prices that perfectly matches buyers and sellers. For a dynamic system such as the economy, there is no requirement that an equilibrium point even exist. The stable point was a mathematical convenience, modeled by 19th century economists after the physics of their time. Viewed in this way, it seems bizarre that unpredictability could somehow be taken as a sign of efficiency and rationality. The reason investors cannot accurately predict fluctuations in the price of gold is not because they cannot determine the substance's intrinsic value. It is because intrinsic value does not exist. The price of an asset reflects the market's consensus about its future value, which is highly variable and prone to all sorts of forces, including irrational ones.

One area where advanced mathematical techniques have been enthusiastically adopted is the proprietary statistical algorithms used by quantitative traders who are often mathematicians or physicists by training at banks and hedge funds. Analysts scour financial data for subtle but persistent patterns for a while that, according to efficient market theory, should not exist, and use them to devise trading strategies. Thriving through leverage and arbitrage, fast trading and risk shuffling, the traders in the major banks have long had access to virtually unlimited funds at near-zero interest rates after 2008 crisis, while the TREASURY and FED anointed most of them as TOO-BIG-TO-FAIL.

In effect the federal government, through FED and scores of other regulators, has socialized the downside of these institutions, enabling them to carry on what they call CREATIVE RISK TAKING. With zero-interest money from FED, the TOO-BIG-TO-FAIL banks bought trillions of dollars' worth of government bonds, and expropriated the spread. Zero interest rates resulted in easy money for highly leveraged WALL STREET speculators, cheap money for the government, but a barren credit landscape for entrepreneurial small businesses. Some 2,600 community banks went out of business. It seemed they were TOO-SMALL-TO-BAIL.

Although EFFICIENT MARKET HYPOTHESIS may not be good science, financial markets are evolutionary systems. Markets are social technology devised for integrating the views of large numbers of people to put prices on complex assets, and allocate capital, not to best use at times and very expensively. The competitive intensity of markets ensures that they are fast at processing information, and that there is pressure on their participants to continuously innovate. Andrew Lo in ADAPTIVE MARKETS: FINANCIAL EVOLUTION AT THE SPEED OF THOUGHT (Princeton University Press, 2014)[1] calls the evolutionary effectiveness of markets ADAPTIVE MARKET HYPOTHESIS and argues that the theory of market efficiency is not wrong, but incomplete. Andrew Lo's paradigm explains how financial evolution shapes behavior and markets at the speed of thought revealed by swings of stability and crisis, profits and loss, and innovation and regulation.

The genius of EFFICIENT MARKET HYPOTHESIS was the way it co-opted the mantras of economic theory, "efficiency" and "rational", to free markets. The equations showed why free markets were so good at setting prices and creating wealth. They also rationalized away problems such as the unequal distribution of riches. Because the markets were rational and efficient, it followed that everything companies or individuals did was in the best interest of society, even if it did not look that way. Anything that impeded its workings, such as government regulation or unions or anti-globalization movements, was by definition inefficient and irrational. But the EFFICIENT MARKET HYPOTHESIS only predicts that we cannot predict, thus providing a convenient explanation for missed forecasts like the 2008 FINANCIAL CRISIS.

In 1974, Paul Samuelson canonized Fama's Efficıent Market HYPOTHESIS by suggesting that most stock-pickers should go out of business, for even the best of them could not always beat the market average. In line with his suggestions, the following year, VANGUARD launched an index fund for retail investors. It was not eagerly received, only raising $17million by 1980. WALL STREET propaganda machine denounced it "un-American". Index investing has prospered lately in the last two decades. Index funds have grown around 6 times faster than those managed by active fund managers who select stocks to buy and sell. Many investors get the average stock market returns for a fee of .03%. SAMUELSON's case for an indexed fund is grounded in the idea that stock markets are "efficient". Any relevant news about a company's prospects is quickly reflected in its stock price. If there were obvious bargains, a little effort would reward the attentive at the expense of slothful investors. But, if more people are buying the index, might it become "deficient"? And might that, in turn, create opportunities for the very stock-pickers who SAMUELSON suggested should cease trading? In fact, the opposite is more likely. If index investing has displaced bad stock-pickers, it will have made the market more "efficient", not less. The whole is the sum of its part, a tautology, is essential to an understanding of why this is so. With index investing the average investor can do as well as the stock market average. For some investors to beat the market, others must be beaten by it. Stock-pickers go to great pains to gather facts, to assess them and to trade them. In spite of the fact that the performance of most mutual funds does not justify these costs, the turnover of stocks has actually increased over time. Active investors are more active than ever. Another supportive observation of financialization. The result, much applauded in business schools, was the rise of "stockholders' wealth maximization" as raison d'etre of corporations, and "short termism" as the emergent phenomena, at the top of the corporation. Financial targets were set and had to be met, whatever their implications for the long term viability of the enterprise. A company that failed to do so could be punished by a declining stock price and, ultimately, the discipline of a hostile takeover, followed by aggressive disruption of the techno-structure. The situation greatly favored the emergence of firms that, unlike the integrated industrial behemoths of the 1950s and 1960s, were purely focused on advanced technology. It is no surprise that high technology elements tended to separate from the large corporation, leading to the emergence of a separate technology sector in the

1990s, the platform company.

Most CEOs are criticized for being slaves to short-term profit targets. Yet few flout the orthodoxy in flamboyant fashion. Consider TESLA, a maker of electric cars. By September in 2017, it missed its production targets and lost $1.86billion of its free cash flow, the money firms generate after capital investment has been subtracted. No matter. When Elon Musk, its founder, muses aloud about driverless cars, space travel, TESLA's stocks rise. 66% since January to October 2017. AMAZON lost $4billion between 2012 and 2014 without being punished by the stock markets. Only 25, or 3.3%, of the Russell 1000 index of large American firms lost over $1billion free cash flow in 2016. In 2007 the share was 1.4%, and in 1997, under 1%. In 2017, NETFLIX and UBER are the other billion-dollar losing tech companies that claim their, so far unproven business models, will transform industries. The other $billion losers were energy companies in the doldrums as they adjusted to the plunge in oil prices. CHESAPEAKE ENERGY has lost at least $1billion of free cash flow a year for 14 years in a row. NEXTERA ENERGY managed 12 rears on the trot. Collectively, TESLA, UBER, NETFLIX, CHESAPEAKE ENERGY and NEXTERA ENERGY have burned $100billion in the past decade, yet they boast a total market value of about $300billion.

DuPont, on the other hand, grew from a start-up gunpowder maker in 1802 to a major global chemical, materials and life sciences company that has endured for over 2 centuries with more than 60,000 employees in 2005 and $27billion in revenue underperformed the broad market indices for much of its history. DuPont's management's focus had been on the endurance of the firm, not on short-term stockholders' wealth. APPLE Inc. is different. In the spring of 2013, Tim Cooks, the company's CEO decided to borrow $17billion, when it already had $145billion sitting in the banks outside of the US, with another $3billion in profits in every month, for buy-backs to goose the company's lagging stock price. The tactic worked. The stock soared, making APPLE the biggest according to market capitalization and yielding hundreds of millions of dollars in paper wealth for APPLE' board members who approved the tactic and for the company's stockholders of whom Tim Cook is one of the largest. APPLE seemed to have applied same level of creativity in financially engineering its balance sheet as it did engineering its products.

One of the quandaries of the last three decades has been the way in which reductions in spending on research and development have coincided with an increasing financialization of the private sector. While causality may be hard to ascertain that will meet Judea Pearl and Dana Mackenzie's expectation they explain in THE BOOK OF WHY: THE NEW SCIENCE OF CAUSE AND EFFECT (Pearl and Mackenzie, 2018)[1] , it cannot be denied that at the same time that private pharma companies have been reducing their research and development budgets, they have been increasing the amount of funds used to repurchase their own stocks, seemingly to boost their stock price, which affects the price of stock options and executive pay linked to such options. In 2011, along with $6.2billion paid in dividends, PFIZER repurchased $9billion in stock, equivalent to 90% of its net income and 99% of its research and development expenditures. AMGEN, the biggest biopharma company, has repurchased stock every year since 1992, for a total of $4.2billion through 2001, including $8.3billion in 2011. Since 2002 the cost of AMGEN's stock repurchases has surpassed the company's research and development expenditures every year except 2004, and for the period 1992-2011 it was equal to fully 115% of research and development outlays and 113% of net income[1]. Boosting stock prices does not create value, but facilitates extraction, rewarding stockholders and executives. The problem of stock buybacks is not isolated but rampant. In the last decade, S&P 500 companies have spent $3trillion on buybacks.

William Lazonick in SUSTAINABLE PROSPERITY IN THE NEW ECONOMY: BUSINESS ORGANIZATION AND THE HIGH-TECH EMPLOYMENT IN THE UNITED STATES (Lazonick, 2009)[1] chronicling stock buyback identifies two trends, when taken together, as a shift from a model of 'Retain and Invest" to "Downsize and Distribute". "Retain and Invest" strategy uses finance only to set up a company and start production. Once profits are being made loans are likely to be at least partly repaid because retained earnings are a cheap way of financing the next production cycle and investments to expand market share. "Downsize and Distribute" is different. It views companies merely as "cash cows" whose least productive branches have to be sold. The resulting revenue then distributed to managers and stockholders, rather than to others such as workers who have also contributed and are contributing to the business. The results may hamper the growth of the company. If the stockholders are happy, however, the strategy is justified. Perversely it was the conservative Japanese who took trading within corporations to a new level. They were slavish lovers of American management theory. They had used the work of Frederick Taylor and Edward Deming to revolutionize manufacturing. TOTAL QUALITY MANAGEMENT, JUST-IN-TIME and ZERO DEFECT. They would do the same with financial management. This was ZAITEC or ZAITEKU, financial engineering. The treasury, the financial function within companies, was to be a profit center. ZAITEKU meant trading in financial instruments to earn revenues for the company. Banks used corporate business to trade and make profits so corporations could use their own flows to make money as well. In management jargon, it was "internalization".

Japanese corporations embraced ZAITEKU with a passion. Following the PLAZA ACCORD in 1985, the yen appreciated, creating havoc among Japanese exporters who had come to rely on the cheap currency. The shift meant that these exporters had to change strategy, which in most cases meant moving production facilities offshore. Unfortunately, one cannot move a car plant to Ohio overnight. Japanese companies tried to use ZAITEKU to generate earnings to cover up the weak profitability of the main businesses. Japanese corporations traded foreign exchange, bonds, commodities, and even equities. Derivatives with their leverage and off-balance sheet nature, were ideal.

In 1967 Sheen Kassouf and Edward O. Thorp in BEAT THE MARKET: A SCIENTIFIC STOCK MARKET SYSTEM (Kassouf and Thorp, 1967)[1] explained how to price convertible bonds which are hybrid securities made up of a bond, which pays a regular interest payment, and those thinly traded warrants, which give the owner the right to convert the security to stock (hence the name of the bonds). Pricing a warrant was a difficult task, since its value depends on forecasting the likely price of the underlying stock at some future date. The system Thorp and Kassouf devised helped them make predictions about the future course of stock prices, and enabling them to discover which convertible bonds were mispriced. The future movement of a stock, a variable known as "volatility" is random, and therefore quantifiable. And if the warrant is priced in a way that underestimates, or overestimates, from its likely volatility, money can be made. Thorp and Kassouf were the first to devise a quantitative method to discover valuation metrics for warrants, as well as correlations between how much stock investors should hold to hedge their position in those warrants. Over time, this way of arbitraging came to be called DELTA HEDGING.

The most famous form of ZAITEKU was the "Japanese warrants arbitrage". Japanese companies issued bonds with attached equity warrants. The warrants gave the buyer the right to buy shares in the company, effectively a call option on the shares. The company received the premium for the option as a low interest rate on its borrowing. The Japanese companies competed with each other to get lower interest rates. Dealers competed with each other to give the Japanese companies lower interest rates. The coupon on the bond reached zero and in some cases the cost of the debt was negative. The companies invested the borrowed money in matching bonds, locking in the difference between the interest they received and the interest they paid, if they paid any at all. The companies booked the difference as profit. Under Japanese accounting rules, the shares to be issued if warrants were exercised did not seem to be taken into account.

Companies invested in bonds that they or other companies issued as part of the debt plus equity warrants issue. The warrants were stripped off and placed with someone, leaving only the bond. The warrant buyer paid a hefty premium to punt on Japanese stock markets going up. In 1980s the NIKKEI only went up. The premium allowed the holder of the bond to earn a decent rate of interest. This was all done with the magic of derivatives, an asset swap.

The company issued bonds with warrants at almost no interest cost, then they invested the proceeds in the same or near-identical bonds at higher rates to lock in profits. The dealers did not care. They were making money going in and coming out. In 1989, the Japanese bubble burst. Japanese companies reported losses, some totaling, billions of dollars. It was not fashionable any more to have treasuries as profit centers in Japanese corporations.

NIKKEI, after reaching a high of more than 39,000 in 1989, took a nosedive and everything else followed. Few warrants were ever exercised. The Japanese companies had sold the call options on their own stock at the top of the market and banked profits. The warrant buyers were the losers. In a perverse twist, the American and European companies, having exported ZAITEKU to Japan, began feverishly to copy it. Without heeding the lessons of how ZAITEKU's application ended in Japan, academics and commentators eulogized financial engineering as the revolutionary new thing, and some still do even after the 2008 financial crisis.

In ASSET MANAGER CAPITALISM that developed in the United States on the other hand, for those with exceptional imagination, scientific talent, quantitative wizardry, or just skills to persuade venture finance that they possess these traits, the prospects and outcomes were spectacular. They could raise huge sums, pay themselves well, and start new companies in a hurry. There emerged a new business elite: young, mysteriously knowledgeable, independent, and fabulously rich after their dot.com IPOs with a lot of hype from the media that they paid for, and help they got from FED's Chairman Greenspan's monetary policy, the GREENSPAN PUT, that eventually the taxpayers and/or owners of worthless bonds, Western retirement systems and their central banks would pay for.

At first glance, the new business elite of the 1990s appeared to be very different than salaried, bureaucratic engineers and organization men of the 1950s and the 1960s who ran the large corporations associated with Alfred Sloan at GENERAL MOTORS. In fact, they appeared to be a familiar type, much celebrated in the economics of an earlier age. The identification of the new class of business leaders with the old entrepreneurial archetype was irresistible in an age when ideas of Friedman and Hayek were being aggressively promoted in business schools to justify the triumph of free markets. In fact, there was little similarity between the old and the new entrepreneurs. To a large degree, the new technology entrepreneurs were in fact the same people who had formerly worked in the great labs of the large corporations. There was also a large difference in what they did.

The "rugged entrepreneur" of the supposed old days triumphed by building smarter and cheaper and by working harder and by attracting and holding customers and market share. All of that took time, and time was something for which the information technology boom had no time. Instead, in the new age, there was a shortcut. Getting rich simply meant getting the approval of the capital markets. The right connections, a patent, a trade secret, and a business plan where the preconditions for raising money. Actual business success would come later, if it came at all. One would find out, after the fact, who had a brilliant innovation and the capacity to pursue it and who did not. But all the executives were rich, at least for a while, as soon as the money had been raised.

The investment bankers and the technologists were closely allied in the emerging ASSET MANAGER CAPITALISM. Innovation in one area, Michael Milken's JUNK BOND MARKET, helped fuel the growth of the other. The financiers combined with the techno-entrepreneurs promoted a new vision of the NEW ECONOMY, a NEW PARADIGM, hence the 1990's business school heresy. EFFICIENT MARKET HYPOTHESIS holds that all the information available that could affect the market price is already embodied in the market price. So although the market may turn out to have been "wrong" in retrospect, in the sense that it priced a stock cheaply that subsequently soared, or priced expensively another one that subsequently plummeted. It is never wrong prospectively. That is to say, it never ignores or misuses information, leading to systematic mispricing. Accordingly, if market prices diverged substantially from what traditional valuation models suggested was fair and reasonable, there must be something wrong with traditional models. The search was on for new models suggesting that market values were fair and reasonable. Hence the idea of the NEW ECONOMY and the spate of new ways of valuing companies, especially those that did not make any profits and seemed unlikely to do so for the foreseeable future. There is a difference between a manager running a company that is not his own and an owner-operated business in which the manager does not need to report numbers to anyone but himself, and for which he has a downside. Corporate managers have incentives without disincentives. The asymmetry is visibly present. Volatility benefits managers since they only get one side of the payoffs. The main point is that they stand to gain from volatility, the more variations, the more value to this asymmetry. In 2018, Larry Culp, the new CEO of GENERAL ELECTRIC, was awarded a contract that could pay out $237million. In 2017, a CEO at one of America's 350 largest firms earned on average $18.9million, according to ECONOMIC POLICY INSTITUTE of Washington D.C., that is 312 times as much as the average worker's earnings- a ratio close to its peak, 344, in 2000. The similarity between 2000 and 2017 is the soaring value of stock options. The stock market was at the end of a long boom in 2000 and surged again in 2017, prompting many CEOs to cash in their stocks. Before enthusiasm for awarding stock options to executives took off as USA moved from MANAGERIAL CAPITALISM to ASSET MANAGER CAPITALISM, the ratio between CEO and worker pay was 32, just as CEOs started to be paid more in form of equity, the stock market took off. At the start of 1985 American stocks traded at on a cyclically adjusted ratio of 10, in 2018 the ratio is over 31 according to Robert Schiller of Yale University.

A FORTUNE study in 2013 showed that only 1% of the American companies poached a CEO from abroad, and many promote from the inside. In Japan CEOs have rarely been given stock options, and Japanese executive pay is a little more than a 10th of that in America, and about a quarter of the British level. Deborah Hargreaves in ARE CHIEF EXECUTIVES OVERPAID?[1] summarizes that CEOs' pay in FTSE 350 companies rose by 350% while pre-tax profits rose by 195% and revenues by 140% between 2000 and 2013. One problem is that the award of equity to executives means that the income-rich and the capital-rich are more than ever the same people in the USA and the UK. Near industrial history of the United States, according to business school mantra, was to be seen as indistinguishable from a world of free and competitive markets. In the textbook sense, a very large number of very small firms, each produced a standard product by standard methods and taking prices as given by the market itself. The well-developed, highly stylized, utterly irrelevant principles of the free and competitive markets were to be applied to the world of unstable and changing corporations, whatever the violence to the facts. The business schools in America propagated the revival of conservative myth, the application of a set of aged ideas to a world in no way suited to receive them.

In ECONOMYTHS: TEN WAYS ECONOMICS GETS IT WRONG (Orrell, 2010)[1] David Orrell states: "Orthodox neoclassical economic theory is a mathematical representation of human behavior, and like any mathematical model it is based on certain assumptions. In the case of economics, the assumptions are largely out of touch with reality. Many think the assumptions are reasonable because they are based on ideas from areas like physics or engineering that are part of the West's 2,500-year scientific heritage dating back to ancient Greeks. Superficially orthodox economic theory seems to have the look and feel of science, without empirical verification of sciences." (Orrell, 2010).

The orthodox economic theory, in its linearity, rationality, and obsession with concepts such as scarcity and equilibrium, is PYTHAGOREAN to the core, and has been ever since the subject was modelled after physics in the 19th century. David Orrell adds: "Neoclassical economics was explicitly modeled after NEWTON's "rational mechanics". NEWTONIAN dynamics can be expressed through the calculus of variations as an optimization problem: objects moving in a field take the path of least action. LEIBNIZ had explained the idea by comparing God to an architect who "utilizes his location and the funds destined for the building in the most advantageous manner." Reasoning along the same lines, neoclassical economists assumed that in the economy, individuals act to optimize their own utility – defined rather hazily as being whatever is pleasurable for that person – by spending their limited funds. Economists could then make NEWTONIAN calculations about how prices would be set in a market economy to arrive at what William Stanley Jevons called a "mechanics of self-interest and utility". (Orrell,2012).

David Orrell's synthesis is "A reason why mathematics works so well in physics is that, as far as we are told, subatomic particles such as electrons and quarks are the same everywhere in the universe. As a result, a hydrogen atom on Earth is the same as one in the Sun. People on the other hand, are different. To get around that problem, economists argued that what really counted was the behavior of the "average man". This concept was first introduced by the French sociologist, Adolphe Quetelet, who saw the average man as representing "perfect harmony, alike removed from excess or defect of every kind the type of all which is beautiful – of all which is good". As economist Francis Edgeworth put it, "the first principle of economics is that every agent is actuated only by self-interest." Thus was born HOMO ECONOMICUS, or "rational economic man" – an idealized expression of Nietzsche's APOLLONIAN PRINCIPIUM INDIVIDUATIONIS. (Orrell, 2012).

David Orrell adds, "Using this imaginary being as the atom of the economy, economists argued that in a competitive market prices would be driven to a stable equilibrium via Adam Smith's invisible hand. If a particular good were too expensive, then more suppliers would enter the market and competition would drive the price down. If prices were too low, then suppliers would go broke or leave and the price would rise. The result, according to Francis Edgeworth, would be "the maximum pleasure" for both individuals and society as a whole. In the 1940s, John Von Neumann used "rational economic man" as the basis for his game theory, which studied the interactions between rational actors who are trying to optimize their own outcomes in artificial games." (Orrell, 2012). David Orrell enlightens the ideological use of the fixed point theorem during the COLD WAR. "In the 1960s, economists Kenneth Arrow and Gerard Debreu used a method popular in game theory known as

BROUWER's FIXED-POINT THEOREM to prove that, under certain conditions, free markets lead to optimal "fixed point" for the economy in which prices are set at their correct levels and nothing can be changed without making at least one person worse off. This result – a harmony of parts in which any change is for the worse - was soon being claimed as proof that capitalism was superior to communism. But to accomplish this feat, the powers of "rational economic man" had to be extended to include infinite computational power and the ability to devise plans for every future eventuality. The ARROW-DEBREU MODEL is called the crown jewel of neoclassical economics, and inspired the development of GENERAL EQUILIBRIUM MODELS which are still relied on by policy makers today. Unfortunately, numerous studies have shown their predictive accuracy is not much better than random guessing" (Orrell, 2012). Philip Mirowski' MACHINE DREAMS (Mirowski, 2002) provides a detailed history of COWLES COMMISSION's AND RAND CORPORATION's role in the development of the ARROW-DEBREU MODEL.

Markets, capital market in particular, are not equilibrium seeking systems. They are complex systems. Risk is not normally distributed. It is distributed along a power curve. Events are not random. They are path dependent. The most catastrophic outcome is not a linear function of scale. It is super linear function. Capital markets and the global financial system are vulnerable to a collapse because of the dense interconnectedness of mega banks.

11.Fire (finance, insurance, real estate) on planet earth (ocean). is it arson?

The whole of economic life is a mixture of creative and distributive activities. At any given stage of economic development, successful societies maximize the creative and minimize the distributive. Societies where everyone can only achieve gains at the expense of others are generally impoverished. They are also usually intensely violent. A critical distinction that Roger Bootle makes in THE TROUBLE WITH MARKETS: SAVING CAPITALISM FROM ITSELF (Bootle, 2012)[1] is between creative and purely distributive activities. Bootle's distinction is close to what William J. Baumol highlighted in his delineation of ENTREPRENEURSHIP, MANAGEMENT, AND THE STRUCTURE OF PAYOFFS (Baumol, 1993)[1]. The market economy creates GDP growth not because every person is continually involved in activities that, in classic income-accounting terms, create value, but because on the average competition between individuals and firms are in their direct effects purely distributive.

Bootle suggests that as average income increases richer societies tend to become more litigious societies. In richer societies consumers are able to devote a significant slice of income to buying goods solely because they bear a brand. An increasingly rich economy is likely to be one in which more of productive activities are devoted to zero-sum and distributive competition. As the richer societies get, as measured by per capita GDP, the more arbitrary and uncertain some of the conventions required to calculate GDP becomes.

Rana Foroohar in MAKERS AND TAKERS: THE RISE OF FINANCE AND THE FALL OF AMERICAN BUSINESS (Foroohar, 2016)[1] agrees with Adair Turner who in BETWEEN DEBT AND THE DEVIL: MONEY, CREDIT, AND FIXING GLOBAL FINANCE (Princeton University Press, 2016)[1] explains that rather than funding new ideas and projects that create jobs and raise wages, finance has shifted its attention to securitizing existing assets like homes, stocks, and bonds and such, turning them into tradable products that can be sliced and diced and sold as many times as possible, that is, until things blow up, as they did in 2008. Turner estimates that a mere 15% of all financial flows now go into projects in the real economy. The rest simply stays inside the financial system, enriching financiers, corporate titans, and the wealthiest fraction of the population, which hold the vast majority of financial assets in the United States and, indeed the world.

Rana Foroohar claims that America's shift to ASSET MANAGER CAPITALISM in which finance became an end of itself, rather than a helpmeet for Main Street, has been facilitated by many changes within the financial services industry. One of them is a decrease in lending, and another is an increase in trading, particularly the kind of rapid-fire computerized trading that now make up more than half of all US stock market activity. The entire value of the New York Stock Exchange now turns over once every 19 months, a rate that has tripled since 1970s, growing the size of the securities industry 5-fold as a share of GDP between 1980 and mid-2000s while bank deposits shrunk from 70 to 50% of GDP.

In this man-made ecology, the financial sector's share of the US GDP has soared from 2.5% in 1947 to 4.4% in 1977 to 7.7% in 2000. By then some 40% of corporate profits of the companies listed in S&P 500 were in the financial sector. These firms' share of the total S&P 500 market capitalization was approximately 25%. Even more startling, the combined income of the nation's top 25 hedge fund managers exceeded the compensation of the combined income of the CEOs of all companies listed in the S&P 500. In 2008, no less than one in every $13 in compensation in the US went to people working in finance. By contrast, after WWII a mere one in $40 was the compensation of the people who worked in finance. In the first half of 2015, the United States boasted $81.7trillion worth of financial assets, more than combined total of next three countries, China, Japan and the United Kingdom. One of the most pernicious effects of ASSET MANAGER CAPITALISM has been the rise of finance and its role in the growth of massive inequality. The attenuation of ownership has reached a point where between one-third and one-half of most of the large corporations in the United States are owned by institutions, not by only mutual funds, but insurance and pension funds, charitable endowments, churches, colleges and universities, public service foundations, and private trusts funds generally. At first glance one might think that the vesting of ownership in such responsible hands of money managers would make for stability. Quite the contrary. The managers of funds are indeed responsible, but theirs is a fiduciary responsibility, which constrains them to accept whatever offer promises the highest immediate gain for beneficiaries and their asymmetric bonuses. If they do not, they may find themselves defendants in a suit for damages.

The predominant neoclassical economics has perceived increased financial activity – greater market liquidity, more active trading, financial innovation – as broadly positive development. This is because extensive financial activity is essential to 'complete' markets. The first fundamental theorem of welfare economics, demonstrated mathematically by Kenneth Arrow and Gerard Debreu, illustrates that a competitive equilibrium is efficient. Complete and perfect markets deliver a PARETO-EFFICIENT equilibrium, in which no one person can be made better off without making someone worse off. And the development of the efficient-market and rational-expectations hypotheses suggested that financial markets are in fact efficient, and that the conditions required for efficiency and for rational and stable equilibria apply even in contracts between the present and the future, which financial markets provide. Together these ideas provided the intellectual underpinning for the powerful ideology of market liberalization and deregulation, an ideology that became increasingly dominant over the last several decades – the Washıngton Consensus.

According to Washıngton Consensus, almost all economic activities could be made more efficient if markets were allowed to operate with minimal interference. Free trade, product-market liberalization, and structural reform of labor markets were all perceived as elements of a universally relevant policy approach, and free financial markets with unrestricted flow of long and short term capital, and financial deepening with access to a wide array of different financial markets and services as essential to the efficient allocation of capital. The political ideology was free-market capitalism. The intellectual underpinning was the concept of market completion. The idea that the more market contracts could exist, and the more freely, fairly, and transparently they could be struck, the closer we could get to the most efficient possible outcome, the one most favorable to human welfare. One of the consequences of the capital-account and financial-market liberalization that followed was a very steep increase over the last 30 to 40 years in the relative scale of financial activities within the economy, with dramatic increases in capital flows, in the financial markets' trading volumes, and in the size of financial institutions' balance sheets relative to real non-financial activities.

The financial system had grown too large. It had ceased to be a means to an end and had become an end in itself. The size and scale of financial market activity in relation to the underlying economy has led some to question whether unfettered free market economy had promoted finance, the servant, to the position of master of the economy and, more broadly, society. An excessively large financial sector relative to the GDP should be a cause of concern to those interested in long-term economic growth because financial crises are often associated with unsustainable growth of the financial sector. Mariana Mazzucato in the value of everythıng: makıng and takıng ın the global economy (Mazzucato, 2018)[1] scrutinizes the way economic value has been accounted and reveals how neoclassical theory failed to delineate the difference between value creation and value extraction, allowing certain actors in the economy moving around existing value or, even worse destroying it to benefit themselves.

A 2011 study by the SWISS FEDERAL INSTITUTE OF TECHNOLOGY mapped the network of direct and indirect ownership links between 43,000 transnational corporations to make a map of financial power in the global economy. The research summarized that less than 1% of the companies were able to control 40% of the entire network. Most of these powerful companies were financial institutions from the "virtual" financial economy, companies that make money out of money. As the researchers point out, this dominance by a small group can be viewed as the outcome of a natural process and does not demonstrate conspiracy or collusion.

The distribution of power in the economy is related to the fractal structure which characterizes many natural systems. A common property of fractal objects is that their features exhibit what is known as scale-free, power-law statistics. There is no typical size or scale. The only rule is that the larger event or feature is, the less likely it is to happen. There is no such thing as "normal" pattern and extreme events are part of the landscape. Similar relationships hold for price changes in a stock market, the size of craters on the Moon, the diameters of blood vessels, the populations of cities, wealth distribution in societies, and many other phenomena. But it is clear from the network map of the SWISS FEDERAL INSTITUTE OF TECHNOLOGY that the symmetrical neoclassical picture, which sees the economy as being made up of independent "average" firms of similar power, is rather misleading as Benoit Mandelbrot has argued since 1975 in FRACTALS: FORM, CHANCE AND DIMENTION (Mandelbrot, 1998)[1].

In the three decades before the crisis, the financial services industry has undergone exorbitant and utterly unwarranted growth, driven by financial liberalization, financial innovation, elimination of capital controls, and globalization of finance. This triumph of finance is inexorable so long as ownership carries no responsibilities. Irresponsible owners are classical HOMO ECONOMICUS par excellence, and they go where they can get the most of what they are interested in, which is money. Hence they put pressure on brokers to find them companies that will slake their thirst. Brokers pressured investment bankers to float the issues of such companies. Investment bankers pressured commercial bankers to give priority to such companies. Pressure, then was brought to bear on the management of public companies to do whatever needed to be done to thicken the bottom line. Frequently, merger-and-acquisition-and-diversification is the outcome. Bottom line is improved by rationalizing the merged companies by downsizing, closing plants and firing people. Finance remained relatively independent from the rest of economic activity, and even became predatory and destructive toward it.

One property of such networks is that they are susceptible to seizure-like failures. As Albert-Laszlo Barabasi wrote in BURSTS: THE HIDDEN PATTERNS BEHIND EVERYTHING WE DO, FROM YOUR E-MAIL TO BLOODY CRUSADES (Barabasi 2011)[1] "Cascading failures are a direct consequence of a network economy, of Inter-dependencies induced by the fact that in a global economy no institution can work alone" (Barabasi 2011). Orthodox neoclassical economic theory is based on a very particular type of network, one in which economic agents have no connection with one another at all, except to buy and sell.

12.The cesarean birth of fx market: privatization of the measuring stick of world's monies

We need to try to model the economy not as an efficient and independent machine, but as something more like a living ecosystem. Adam Smith's invisible hand is an emergent property of this system, which never reaches an optimal equilibrium, but instead is fundamentally dynamic and unstable, with complex effect on society. The financial network is both highly creative and prone to seizure-like crashes. The entire financial system is now described as a kind of virtual network of electronic information. Since President Nixon's exit from BRETTON WOODS AGREEMENT, currencies have floated against one another. The result has been an explosion in the amount of currency dealing. Every day, around $5trillion is shuffled around computer networks, bouncing off satellites, relaying through computer terminals, like the neural signals of a giant electronic brain. Before Nixon's exit from the BRETTON WOODS AGREEMENT, "EUROCURRENCY MARKETS had its roots in the operations of private-sector British banks at the end of the 1950s. That is, in response to the restrictions on capital movements enacted in Britain at that time MIDLAND BANK and other corporate banks began investing deposits accepted in foreign currency (in this case dollars) as foreign currency, instead of converting it to domestic currency (pounds sterling). According to the definition used by BIS authorities at the time the most important currency in the EUROCURRENCY MARKETS, the EURODOLLAR, referred to 'ordinary dollars at short term or sight by the owner (who is usually resident outside the United States) with a bank or financial institution outside the USA. While such deposit currencies also were in existence prior to World War II, what was new about the EUROCURRENCY MARKETS was 'the scale on which it is now taking place, the extent to which operations are conducted across national frontiers and, perhaps, the degree of completion among banks for foreign currency deposits." wrote Kazuhiko Yago in THE FINANCIAL HISTORY OF THE BANK FOR INTERNATIONAL SETTLEMENTS (Yago, 2013).

Excess credit creation of American banks and their affiliates in EURODOLLARs resulted in radical increases of foreign investments by American corporations in Europe in the 1960s. Then the US dollar was effectively the world's currency, and thus additional creation of dollars was expected to be diffused around the world without any adjustment in exchange rates until the world rebelled. When the US corporations tried to buy the world with the credit American banks and their affiliates created, France called the US's bluff that set the value of the US dollar at $35 for one Troy ounce of 24 karat gold with BRETTON WOODS AGREEMENT. France decided to convert US dollars into gold at the official fixed price, as BRETTON WOODS SYSTEM formally provided for. The US leadership had to make the decision either to keep its promise and redeem the excessively created dollars into gold, or break its promise and with it bring down the BRETTON WOODS SYSTEM of fixed exchange rates. France proceeded to demand conversion of dollars into gold, in an episode later called the "French raid on Fort Knox". President Nixon decided to break US's promise. He closed the GOLD WINDOW. With this, the fixed exchange rate system had ended, and currencies started to float for the first time without any link to gold. The fiat money float began to emerge, FOREIGN-EXCHANGE (FX) market.

President Nixon ended dollar's tie to gold on 8/15/1971. Two decades later, monetary policies of Alan Greenspan pushed the prices of financial assets and real estate up making them havens for investors to avoid US dollars' depreciation, as the US economy changed from an industrial powerhouse into a financial and consumption casino that imploded with 2007-2008 financial crisis. According to BANK OF INTERNATIONAL SETTLEMENTS (BIS), in 2013 at $5.3trillion per day, FX, currency trading dwarfed all the globe's stock markets and was 73 times greater than all global trade in goods and services. Only interest rate swaps were a match in daily volume some days.

It seems that nobody called Japan's bluff during the 1980s, when the credit Japanese banks created enabled Japanese corporations' purchasing sprees of buying foreign assets. The world seemed to have enjoyed not suffered from YEN ILLUSION. When BANK OF JAPAN abruptly stopped credit creation in 1989, JAPAN's double bubbles burst and capital outflows from Japan came to a halt and eventually reversed.

However, in this new world of floating currencies Nixon's decision gave birth placed a great burden on the newly born foreign exchange markets. If a country decides to create more purchasing power than is backed by its real economic activity, the task of recognizing this was now foreign exchange markets' by selling enough of this currency to reduce its value. The Japanese experience of the 1980s demonstrated that even the yen-dollar foreign exchange market, the most liquid market in the world, failed its responsibility. Apparently foreign exchange market participants for years were either unaware of the BoJ's excessive credit creation, or failed to understand its implications and act accordingly.

Free-floating exchange rates was another of Milton Friedman's free market prescriptions. Free-floating exchange rates were originally intended as a substitute for pre-1971 gold standard that Friedman despised. Friedman liked the idea of elastic money to give central bank planners the ability to fine-tune the money supply to optimize real growth and price stability. Gold, he considered, inelastic. And not suitable for the fine-tuning discretionary monetary policies needed. Friedman's prescription was that gradual changes in exchange rates would rise or lower relative prices between trading partners, and these changes in terms of trade would reverse trade deficits, mitigate trade surpluses, and restore equilibrium in trade without shock devaluations of the kind the United Kingdom experienced in 1964 and 1967. Friedman's academic prescriptions ignored the real world behavior of financial intermediaries like banks and hedge funds that create leverage and derivatives. Financialization dominated and amplified the smooth exchange-rate adjustments Friedman fantasized.

What followed was borderline hyperinflation in the late 1970s, and a succession of asset-bubble booms and busts in 1985 Latin American Debt, in 1987 US Stock market crash, in 1994 Mexican peso, in 1997 Asian debt, in 1998 Russian debt and derivatives, in 2000 dot.com stocks, in 2007 mortgages and in 2008 derivatives again. On two of those occasions, 1998 and 2008, twice in 10 years, the global capital markets came to the brink of total collapse.

The FORIEGN-EXCHANGE (FX) market is not transparent, but opaque. At its beginnings, it is mostly technologically old to accommodate its oligopolistic market structure. Old-boys' network. And, it is colossal. Most of its $5trillion of daily trading happened 'over-the-counter' (OTC), in deals negotiated between banks and private customers, rather than on exchanges. Many orders were still placed by phone. To gauge its market's size and structure usually mandates reliance on outdated surveys provided by outsiders. The most comprehensive review, by the BANK OF INTERNATIONAL SETTLEMENTS, is conducted only once every three years. Yet modernity is arriving in fits and starts. In April, 2019, it emerged that DEUTSCHE BORSE, Europe's third largest stock exchange, was negotiating to buy FXall, an electronic FX-trading platform, for a reported $3.5billion. It signals at a shake-up in a sector that has long been deemed antediluvian.

Since the publication of Michael Lewis's Flash Boys: a Wall Street Revolt (Lewis 2014)[1] discussions of high frequency trading and accusations that the market is rigged were directed to stock markets. What is less known is that similar issues exist in spot foreign exchange markets (FX). Currencies provide certain market participants with significant economic advantages. FX is highly commoditized asset traded in global and significantly fragmented market with various models of trading, - bilateral, multilateral, wholesale, retail - in dark and lit markets. All are very conducive for computer algorithms. There are ample opportunities to take advantage of asymmetrical access to speed and information. FX trade data is largely proprietary, opaque and not reported to national regulators to the same extent as data on other asset classes. In comparison to stock markets, there is less awareness. Furthermore, market participants are heterogeneous. The FX market trades 24 hours a day, five-and-a-half days a week. It is decentralized and highly fragmented. A growing portion of trading is being undertaken on electronic platforms or through large banks that internalize order flow via single-dealer platforms. About 41% of global FX trading involves just 2 currency pairs EUR v USD and USD v JPY. Spot FX has a relatively small average size USD1-2million. Relative simplicity, high liquidity, and small average trade size is amicable for high frequency trading. Voice trading is largely restricted to abnormally large trades and high net worth individuals and complex transactions. Billions of dollars have been invested in creating a complex network of data centers, underground cables, and microwave signals, typified by spread networks and seaborn networks' 2017 launch of a submarine fiber optic cable system from data centers in Carteret, New Jersey to BM&F Bovespa Stock Exchange in Sao Paulo, Brazil. The goal of these investments is to reduce 'latency', the time that passes between electronic messages, so that customers can execute, amend or cancel orders as quickly as possible. The proliferation of electronic trading venues and data centers, combined with the ability to purchase faster access and information, has created an asymmetry between more and less-informed participants. One of the most common methods of exploiting this asymmetry is to engage in what is referred as 'latency arbitrage', and is highly prevalent in FX markets. Latency is integral to the use of first-in-first-out (FIFO) order stacking in high frequency trading. FIFO order stacking refers to a method in which orders are placed at every potential price level possible before any other counterparty places orders. By stacking orders, an HFT algorithm can acquire this information before other market participants. Front-running occurs when a market participant trades based on advance knowledge of pending orders from another market participant, allowing him or her to profit from that knowledge. The ability of certain firms to acquire faster access to venues has made it possible to obtain data on other firms' trading intentions, known as information leakage. Access to this data in conjunction with the ability to trade faster than other participants, provide certain firms with significant advantage. Firms can exploit this advantage by trading before slower, less informed participants with extremely small time periods, milliseconds or microseconds, and in a manner that is difficult to detect. A number of additional forms of high-speed manipulation are based on cancellation of orders. Spoofing occurs when a market participant submits a flurry of orders to buy or sell a financial instrument in order to create the illusion of market liquidity. Once other market participants react to this apparent activity and the price changes as a result, the spoofer quickly cancels their orders and trades against those market participants, profiting at their expense. Layering is a similar tactic in which traders place and cancel orders on both the buy and sell sides to create the illusion of general market activity in the particular currency. Not every strategy, however, is designed to give the appearance of liquidity. Quote stuffing, for example, is a method by which algorithms flood the market to overwhelm data feeds and create delays. The ensuing confusion creates opportunities to mask activity. The liquidity mirage in FX refers to the illusion of liquidity created by the tremendous number of prices placed and ultimately cancelled. Speculative participants submit multiple orders on multiple venues based on the same data point, giving a false impression of the demand/supply for that particular currency at that particular price. This may reflect nefarious activity or simply legitimate strategies that involve amending orders.

In the age of high frequency trading, a great majority of venues monetize informational asymmetries by allowing users to pay more to acquire superior data before those that do not pay. They also let firms place their servers next to the trading venue, known as co-location. Then, they pay participants to direct trades toward their venue, commonly referred as 'payment for order flow'. In order to pursue latency-driven strategies, firms need to have faster access to trading venues than competition.

The FX market serves not only investors, but corporations and governments seeking to protect trade or bonds against currency swings. FX contracts can be 'spot' for immediate delivery, 'forward' for delivery at a later date, or 'swap' when currency is exchanged back at maturity. Buyers go through dealers, mostly big banks, which source liquidity. Specific needs, such as matching cash-flow dates, are met using OTC trades. This is not likely to change soon. Rather, DEUTSCHE BORSE is betting that buyers will abandon "voice" orders, placed via single banks, in favor of digital platforms that pool prices from multiple dealers. The trend is already boosting e-trading in spot FX. Over the last 10 years, volumes have doubled and FXall's share of this electronic activity has reached 40%.

FX trading becoming digital, and an increasing proportion of market making is performed by proprietary trading firms utilizing high frequency strategies. Further, participating FX markets are now faced with and increasingly fragmented landscape of execution venues, complicating a market that has historically been dominated by big banks. FX platforms pay for order flow, offer colocation services, and sell faster access to trade data. These services have created concern among FX participants and national regulators that brokers may be directing their clients' order flow to whichever venue offers the best rebate rather than the best possible price. Digital FX markets are now vulnerable to high frequency methods of manipulation, including spoofing, layering and quote stuffing. The same type of flash crashes that plague digitalized equites trading have also been witnessed in FX. These rapid changes in the price of individual currencies have nothing to do with the fundamental economic purpose of FX markets. The alleged economic purpose is to allow firms engaged in cross-border industry to pay for foreign goods and services and hedge the risks associated with future currency movements. Our ability to understand these developments is undermined by lax reporting standards.

The change has been slower with longer-dated FX-derivatives contracts, such as forwards. The longer the maturities, the fewer the transactions, and the harder it is to connect enough users simultaneously in order to get e-trading to work. But, tighter regulation is increasing costs, that asset managers are seeking to offset elsewhere. European regulators demand that they demonstrate that they are trading at the best possible price. E-trade, by connecting buyers with multiple dealers in an instant, as well as leaving a clear audit trail promises to achieve both. As long-dated contracts become more common, liquidity will be boosted.

As FX goes digital, the ranks of dealers are expected to be reduced. In the spot market, the trend has developed "principal" trading firms, which buy and sell on their account using algorithms. It has also fueled competition among banks, slashing margins and pushing smaller ones to exit the business, leaving bulk of the deals to handful of big banks, often in partnership with principal trading firms. A cozy arrangement for the time being. Maturities beyond a week have been little affected so far. The rise of centralized clearing is also helping to level the playing field. Only 3% of FX derivatives' trades currently go through clearing houses, which absorb the risk one party defaults.

Clearing is set to become more attractive for traders, in part because regulators are requiring higher collateral to be held on some un-cleared FX deals. E-trading already makes it easier for users to find non-bank dealers. By moving counterparty risk, clearing will weaken the advantage that banks with big balance-sheets enjoy over the newer trading firms.

To deal with increases in the floods of money, major banks spent half a trillion dollars on information technology, decisively leading all other sectors on computer outlays. The work of maintaining the measuring stick function of money is estimated to cost 20% more in computer equipment than all the world's information technology for manufacturing new goods. With vastly greater speed and automation, the large banks with big balance sheets perform the role previously played by the gold peg, while at the same time putting constraints on every country to follow its own exchange policy.

Dangerously banking intensive, the system channels all the world's commerce through the portals of the great international banks. Just 10 in the United States and 15 in United Kingdom and enables these to collect fees. With 12.91% of total trading in 2016, the largest player was CITIBANK, J.P.MORGAN and UBS followed with 8.7% and DEUTSCHE with 7.9%[1]. Moreover, that work yields a volatile but steady rising proportion of all banking profits. In this emerged system of private SEIGNIORAGE – profiting from creating money – the largest traders capture hundreds of billions of dollar's equivalents every year from setting the measuring stick. FX market is a speculative ocean of currencies that banks surf for profits. These banks extract the fees as a kind of volatility tax on entities that use them to hedge currencies.

By various measures 90% to 97% of all transactions are judged to be "speculative" devoted not to enable trade in goods and services but to harvest profits and fees from arbitrage and leverage. Transacting some 77% of the business are 10 banks in the Western countries. In the forefront of the foreign exchange operations are the US and Europe, with London accounting for 36% of all trades. Some 87% of transactions involve the US$, in which 63% of all international trade is denominated. Two thirds of emerging market external debt and two thirds of official foreign exchange reserves of all central banks are in US$s when GDP of the United States accounts just 23% of global GDP and only 10% of global trade. FED's soft power exerted via the dollar has become more important in the decade since the financial crisis and America's monetary policymakers' ability to create problems for their counterparts elsewhere.

Currency trading has been rising at least 20 times faster than productivity growth. Devoid of Isaac Newton's gold standard that made economic valuations calculable and reliable as the physical dimension of traded items, China, Hong Kong, Singapore and Taiwan, that have spearheaded the global trade expansion in recent decades, have all largely opted out of the floating-currency system. Against agonized protests from the West, lately loudly from President Donald Trump's White House, they fix their currencies on the dollar as much as possible, and some of them impose controls on capital movements. Outside of the Asian emerging sector, world trade has inched up only slowly. Likewise, global GDP growth. A privatized SEIGNIORAGE conundrum.

US is uniquely well positioned to use financial warfare in the service of foreign policy. The dollar is used globally as a unit of account, store of value and medium of exchange. At least half of cross-border trade invoices are in dollars. That is 5 times US's share of world goods imports, and 3 times its share of exports. The dollar is the preferred currency of central banks and capital markets, accounting for close to two-thirds of global securities issuance and foreign-exchange reserves. The world's financial rhythm is American. When interest rates move or risk aversion on Wall Street shifts, global markets respond. The world's financial plumbing, SWIFT and CHIPS, ultimately clears most international dollar transactions through New York by American corresponding banks. America uses these systems to monitor activity. Any organization that is denied access to SWIFT and CHIPS, is isolated and usually financially crippled. Individuals and institutions across the globe are thus subject to American jurisdiction and vulnerable to punishment.

13.Is planet earth (ocean) alive?

It is a habit of contemporary public relations to frame today's the global economy as 'economy' and, more insidiously, to present it as a natural phenomenon whose putative laws must be regarded with the same deference as the laws of physics. But as some argue cogently, our global economy is but one of many possible economies, and, unlike the laws of physics, we have political choices to determine when, where, and to what degree the so-called laws of economic behavior should be allowed to hold sway. An economy is a man-made ecology, or rather the man-made part of our larger ecology of interaction between the man-made and natural worlds. Neoclassical economic perspective generally fails to recognize that economy is merely one aspect of a whole ecological and social fabric. And at times economists have tried to remodel the environment to fit to the neoclassical model as during Russian transition to capitalism and globalization of finance at the end of 20th century explains Roger E. Backhouse in THE PUZZLE OF MODERN ECONOMICS: SCIENCE OR IDEOLOGY? (Backhouse, 2010).

Planet Earth is a living system composed of human beings in continual interaction with one another and with their natural resources, most of which are, in turn, part of mega-living system, GAIA. Planetary physiology, GAIA, is the result of innumerable beings. GAIA is symbiosis seen from space. Any organism that appears or species that evolves at first has a chance. But to persist, life forms must survive not on their own but within a global environment. They become integrated, or they die away. In the long run organic beings confront their limits of their multiplication. They survive not alone but within a context of global life. Lynn Margulis and Dorion Sagan in WHAT IS LIFE? Margulis and Sagan, 2000)[1] argue that the strength of symbiosis as an evolutionary force undermines the prevalent notion of individuality as something fixed, something secure and sacred. A human being in particular is not a single, but a composite. Each of us provide a fine environment for bacteria, fungi, roundworms, mites, and others that live in and on us. Our bodies are actually joint property of the descendants of diverse ancestors. Survival seems always to require networking, more interaction with members of other species, which integrates surviving species further into global physiology.

The basic reductionist error of the social sciences is to divide this fabric into fragments, assumed to be independent and to be dealt with in separate academic disciplines. Those economists who wished to study economic phenomena as they actually existed, embedded within society and the ecosystem, and who therefore dissented from the narrow economic viewpoint were virtually forced to place themselves outside economic 'science', thus saving the economics fraternity from dealing with the issues their critics raised. Max Weber, for example, the 19th century critic of capitalism, is generally regarded as an economic historian. John Kenneth Galbraith and Robert Heilbroner are often thought of as sociologists. Kenneth Boulding is referred as a philosopher. Karl Marx, by contrast, refused to be called an economist and saw himself as a social critic, asserting that economists were merely apologists for the existing capitalist order. In fact, the term 'socialist' originally described those who did not accept the economists' atomistic view of the world.

By subsuming land within the category of capital, almost all post classical economists treated Nature to be a subset of the human economy, an endless pile of resources to be transformed into wealth. Where economists assume that needed resources will magically arise because the marketplace demands them, a more holistic model would begin with the observation that the economy only exists because resources are available. The economists also assumed that natural resources could always be substituted with some other form of capital, money or technology.

The reality, of course, is that the human economy exists within and entirely depends on Nature, and many natural resources have no realistic substitutes. The natural world is not a subset of the economy. It is the other way around. The economy is a subset of the natural world. This fundamental logical and philosophical mistake, embedded at the very core of mainstream economic philosophies, set society directly on a course toward the current era of climate change and resource depletion, and its persistence makes conventional economic theories, of both Keynesian and neoliberal varieties, utterly incapable of dealing with the economic and environmental survival threats to civilization in the 21st century.

In classical NEWTONIAN science nature was seen as a mechanical system composed of basic building blocks. In accordance with this view, DARWIN proposed a theory of evolution in which the unit of survival was the species, the subspecies, or some other building block of the biological world. But a century later it has become quite clear that the unit of survival is not any of

these entities. What survives is 'the organism-in-its-environment'. Matt Ridley in NATURE VIA NURTURE (Ridley, 2003)[1] shows that nature evolves via nurture. An organism that thinks only in terms of its own survival will invariably destroy its environment and, as we are learning from bitter experience, will thus destroy itself.

From the systems point of view the unit of survival is not an entity, but rather a pattern of organization adopted by an organism in its interactions with its environment. Evolution is basically open and indeterminate. There is no goal in it, or purpose, and yet there is a recognizable pattern of development. The details of this pattern are unpredictable. In the systems view, the process of evolution is not dominated by 'blind chance' but represents an unfolding of order and complexity that can be seen as a kind of learning process, involving autonomy and freedom of choice.

The systems approach to economics will make it possible to bring some order into the present conceptual chaos by giving economists the urgently needed ecological perspective. According to the systems view, the economy is a living system composed of human beings and social organizations in continual interaction with one another and with the surrounding ecosystems on which our lives depend. Like individual organisms, ecosystems are self-organizing and self-regulating systems in which animals, plants, microorganisms, and inanimate substances are linked through a complex web of interdependencies involving the exchange of matter and energy in continual cycles. Linear cause-and-effect relationships exist only very rarely in these ecosystems, therefore linear models are not very useful to describe the functional interdependencies of the embedded social and economic systems and their technologies.

The nonlinear interconnectedness of living systems suggests two important rules for the management of social and economic systems. First, there is an optimal size for every structure, organization, and institution, and maximizing any single variable, profit, efficiency, or GNP for example, will inevitably destroy the larger system. Second, the more an economy is based on the continual recycling of its natural resources, the more it is in harmony with the surrounding environment. In THE TURNING POINT: SCIENCE, SOCIETY, AND THE RISING CULTURE (Capra, 1987)[1], Fritjof Capra offers a compelling vision of a reality, a reconstruction of science and the human spirit for a balanced future. In a world, where everything is anteceded and interconnected, there is no room for autonomous sources of causation. To claim otherwise is scientific heresy and a philosophical death wish. The entelechy, the uncaused causal agent, is fiction and its source is delusional. Fritjof Capra and Pier Luigi Luisi in THE SYSTEMS VIEW OF LIFE: A UNIFYING VISION (Capra and Luisi, 2014) examine autopoiesis, dissipative structures, social networks, and a systemic understanding of evolution and develop a coherent framework by taking a broad sweep through history and across scientific disciplines.

14.Can cook ratios be cooked under the international bank of settlement's (bis's) watchful eyes?

The literal failure of the financial system, and the deep and long recession it triggered, offered a dramatic demonstration of the unsustainability of the way the global financial system had been operating. The huge burden of public debt created in the course of the financial breakdown remains, and remains unsustainable. The debt burden due to financial crisis comes on top of existing government debt burdens, sometimes acknowledged, more often off the books either as a deliberate sleight of hand or because they are implicit in the promise of future pension and welfare payments. As well as repaying the debts incurred in sorting out the banking crisis, taxpayers will have to shoulder the debts created by a system of pensions and social welfare, particularly in the rich countries.

The repaying of the public debt of the financial sector's bailout coincides with the developing demographic problem. In 2019, 40 countries have shrinking working-age populations, defined as 16-65 year-olds, up from 9 in late 1980s, according to the WORLD BANK. China, Russia, Spain joined recently. Thailand and Sri Lanka soon will. The balance between people over 65 and those working age, is known as the old-age dependency. It is likely to deteriorate faster because the ranks of employable are decreasing. In Japan where young people are few and life expectancy long, demographers expect 48 people over the age of 65 for every 100 people of working-age in 2020. In 1990 there were just 17. Some countries face gentle downward slopes. Others face steep slopes. Both China and France are gradually losing working-age people. Numbers in France are expected to fall slowly over the next few decades, but in China the numbers will soon plunge. Partly as consequence of its one-child policy.

For more than a generation Western governments have been borrowing on a large scale from their own citizens. But, the governments of the UK and the USA borrowed increasingly from foreigners, from much poorer countries, and are now also facing old-age dependency problems. The cost of these promises will be piled onto taxpayers as yet unborn or too young to vote plus, of course, the added to the costs of debts created by the bank bail-outs. In some countries the scale of the government debt is so large that it can depress those countries' potential to grow enough ever to meet the burden of repayment.

A growth strategy based on financial deregulation was first adopted by the US and the UK in the early 1980s, and later more extreme forms were implemented by Iceland, Ireland, Latvia and Dubai. What was encouraging more and more countries to adopt a growth strategy based on deregulated finance was the fact that in such a system it is easier to make money in financial activities than through other activities, or so it seemed until the 2007-2008 crises. The financial crisis comes down to one simple fact: liquidity. In other words, the amount of outstanding discounted bills of credit and thus the amount of credit and debt of various agents has increased dramatically by comparison to what was in the 1970s. It seems inflation in the price of goods, or in costs, including wages, for the years 1970-1980 has been replaced by an inflation of financial assets in the 1990s and after. The multiplication of liquidity means of payment on the basis of credit, the true source of the ex nihilo creation of money, has been observed at all stages of history of money and has taken different and highly technical forms lately with derivatives and collateral instruments. The key thing to understand is that transformations of the rules of governing monetary creation in the various different aggregates are all expanding.

The percentage of liquid assets, in other words, the means of mobilizing resources immediately in cash, which previously stood at 8% of their commitment: a proportion known as the COOK RATIO, has been modified. In order to determine the maximum credit that a bank can give in relation to its own funds, that is the capital it is able to mobilize very quickly in order to address repayment requirements, operational risk has now been added, risk of losses due to people or systems failures. This seems to add a measure of improvement, but also a market risk, so that the value of credit granted by the bank has to be adjusted to its market value. If the bank is listed and if the market is on the way up, the assets of the bank increase and the bank itself can grant more credit. If the reverse is true, the bank will have to increase its stockholders' equity by selling shares. This is pro-cyclical. Rather than countering and balancing cyclical movements, it accentuates them. It acts as an accelerator of "Market Exuberance", as Greenspan phrased it, during expansionary periods, and also a decelerator of depression during downturns.

Financial deregulation has been marked by a series of financial innovations such as the securitization of public debt, real estate loans, collateral debt obligations, agreements for insurance on payment default, swaps, leveraged buyouts. There is no point in asking which of these financial innovations and changes in accounting practice came first. Like the chicken and the egg, they emerged in rapid response to each other and each provides backup for the other. It was not clear what the unintended consequences of financial innovations would be at the time, but later we will able to observe what they were. Nationalization of liabilities financial institutions turned their losses into public debt. Leveraging, or the ability to increase the amount of loans granted on the basis of advance deposits and more globally on the basis of the equity of financial institutions, has increased almost five-fold. Whereas formerly $1 of resources immediately convertible into cash would have allowed between $5 to $8 of credit, or fresh liquidity, the cook ratıo, to be offered. By the eve of the crisis the figure was more in the region of $30 to $35. Once a financial backwater with a reputation for excessive regulation, with its stock market only set up in 1985, Iceland was transformed into a new hub in the emerging global financial system. From the late 1990s, Iceland grew at an extraordinary rate and became the 5th richest country in the world after Norway, Luxemburg, Switzerland and Denmark. Ireland tried to become another financial hub through the same strategy, with its financial assets reaching the equivalent of 900% of GDP in 2007 and 11 times before the crisis. And then in 2008, Iceland and Ireland collapsed.

15.Accounting systems that mis-account: is the Chinese accounting system a panacea or placebo for problems of recording and reporting economic activity in 21st century?

Financial accounting has evolved to generate annually published financial statements that are meant to provide corporate transparency. Thereby, enabling the investing public to evaluate corporate behavior and provide the capital markets with the information to help the markets function efficiently. The financial information is provided in three 'statements': the income statement, the cash-flow statement and statement of retained earnings and the balance sheet. But as the notorious implosions of Enron, and other corporate scandals in the late 1990s and early years of the first decade of the 21st century showed these accounting tools cannot be trusted to convey the true state of a business at all. And yet governments, managers, policy makers and shareholders alike depend upon this information when making decisions that affect the lives of everyone.

Almost a decade after ARTHUR ANDERSEN's demise, one of the biggest global accounting firms that enabled accounting scandal of ENRON, 17 days before the collapse of LEHMAN BROTHERS that made it apparent that ERNST & YOUNG's audits of the bank had been all but worthless, on the 28th of August, 2008 SECURITIES AND EXCHANGE COMMISION, (SEC), put forward a time table for switching to INTERNATIONAL FINANCIAL REPORTING STANDARDS, (IFRS), from US GENERALLY ACCEPTED ACCOUNTING PRINCIPLES, (US GAAP). According to SEC, the world lost its trust in the US GAAP and its auditors after the accounting scandals that bankrupted very large American multinational corporations, WORLDCOM, ENRON, and ADELPHIA COMMUNICATIONS, destroying the savings of millions of investors who bought their stocks and bonds in late 1990s and early 2000s. The US GAAP were the accounting standards developed in the United States and imposed on the world after the Second World War through the two institutions created to manage the global economic system; the IMF and the WORLD BANK.

The US GAAP, the financial reporting standards required by SEC until 2008, evolved in a very litigious business eco-system and are highly detailed and address a vast range of specific situations, protecting companies, and auditors against lawsuits. ARTHUR ANDERSEN folded because it was convicted for obstructing justice, not because of its connivance in fraudulent accounting. IFRS, by contrast, have traditionally been principles-based. IFRS lay out key objectives of sound reporting and offer general guidance instead of detailed rules. 25,000 pages of complex US accounting rules was to become obsolete and replaced by some 2,500 pages of IFRS. The proposed shift of rule-making authority was from the domestic to the international level. Government regulators of Japan, Canada, Brazil and India committed themselves to requiring IFRS. The People's Republic of China's first choice was the IFRS, but later they decided to establish their own accounting standards.

The global convergence of accounting standards is largely driven by international integration of financial markets and the increasing complex multicultural structure of corporations. The shift of financial rule-making to INTERNATIONAL ACCOUNTING STANDARS BOARD, IASB, was privatization and internationalization of governance driven by governments' lack of requisite technical expertise, financial resources and flexibility to deal expeditiously with ever complex and urgent regulatory tasks. Tim Buthe and Walter Mattli in THE NEW GLOBAL RULERS: THE PRIVATIZATION OF REGULATION IN THE WORLD ECONOMY (Buthe and Mattli 2018)[1] explain the post GREAT FINANCIAL CRISIS rule-making that is developing the blueprint for the 21st century.

Besides the IASB, two global private regulators are the INTERNATIONAL ORGANIZATION FOR STANDADIZATION, ISO and the INTERNATIONAL ELECTROTECHNICAL COMMISSION, IEC. In these organizations states and governments cannot be members. They are centrally coordinated global networks of technical committees from all over the world and involve tens to thousands of experts representing industries and other groups in developing and maintaining technical standards. ISO and IEC jointly account for about 85% of all international product standards. Product standards are technical specifications of design and performance characteristics of manufactured goods. techıcal barrıers to trade negotiated during the URUGUAY ROUND trade negotiations from 1987 to 1994 incorporated in World Trade Organızatıon AGREEMENT, WTO, obliges all members to use international standards as technical basis for domestic regulations. The annual financial statements of Royal Bank Of Scotland kept in compliance with the Internatıonal Fınancıal Reportıng Standards were audited and signed by Deloıtte & Touche in February in February of 2008. By asset size RBS was bigger than the GDP of the UK. Two months later, RBS was sinking with a loss bigger than 100billion British Pounds. The behemoths of finance and banking regardless of the accounting standards they used brought the financial system down to be bailed out by tax-payers in 2008 causing massive unemployment around the globe. The financial crisis of 2007-2008 seemed to be a gross failure of both of the prevailing financial accounting systems. They both failed to present a true picture of the economic transactions and the true health of the financial institutions. Just four major global firms – DELOITTE, PRICEWATERHOUSECOOPERS (PwC) ERNST & YOUNG (EY) and KPMG audit 97% of US public companies, all the UK top 100 corporations, and 80% of Japanese listed companies. They are the only players big enough to check the numbers for these multinational organizations, and thus enjoy effective cartel status. What is more, since audits are a legal requirement almost everywhere, this is a multi-state guaranteed cartel. The BIG FOUR then multiply their income from 3 fold through consultancy practices and tax services built on the back of their captive audit market. They are allowed to operate with limited liability, suitable only to the extent of the modest funds their partners invested in their firms rather than all their personal wealth. Compulsory rotation of auditors in which the BIG FOUR exchange clients every 10 years or so is what passes for competition at the top of world accountancy. The alumni of the BIG FOUR are the international and national standard-setters, ensuring the rules of the game to suit the major accountancy firms and their clients.

Unlike multinational corporation, which tend to be controlled by a single holding company, the BIG FOUR operate as federations of separate partnerships in each country. While all exploit their brands, the arrangement allows the firms main operations and global headquarters(HQs) to distance themselves from misdeeds elsewhere. The BIG FOUR make about a third of their income from auditing and related assurance services. They are consultancy firms with auditing sidelines, rather than the other way round. Where once they were outsiders scrutinizing the commercial world, the BIG FOUR are, in the 21st century, insiders burrowing ever deeper into it. Richard Brooks in bean counters: the Trıumph of the accountants and how they broke capıtalısm (Brooks 2018)[1] concludes that bean counting is too important to be left to today's bean counters.

The years since ENRON's collapse saw a string of similar-sized calamities. During the 2008 FINANCIAL CRISIS, for example, auditors were enmeshed in collapse of major banks and financial services corporations. All the BIG FOUR had clients that collapsed or required bailing out or nationalization. DELOITTE was the auditor of BEAR STEARNS and FANNNIE MAE. KPMG was of CITIGROUP, the recipient of the biggest bail out. PwC was the auditor of AMERICAN INTERNATIONAL GROUP (AIG) and GOLDMAN SACHS. EY was of LEHMAN BROTHERS. Ian D. Gow and Stuart Keels in THE BIG FOUR: THE CURIOUS PAST AND PERILOUS FUTURE OF GLOBAL ACCOUNTING MONOPOLY (Gov and Keels 2014)[1] conclude that with respect to their scale and consequences, the audit failings during FINANCIAL CRISIS and subsequent years were as bad as the downfall of ENRON, of WorldCom and of WASTE MANAGEMENT and others that led to the regulatory response, the SARBANES-OXLEY ACT of 2002. The audit failings of the BIG FOUR of the institutions that failed causing FINANCIAL CRISIS are supportive evidence of the failure of SARBANES-OXLEY ACT.

As multinational corporations emerged to be the economic managers of the world under the guiding light of WASHINGTON CONSENSUS, a highly profitable business line presented itself, BIG FOUR's taxation services which provided multinational companies' compliance with their international tax obligation by minimizing their overall tax liability. BIG FOURS's tax specialists helped multinational move income to low-tax locations. They set beneficial prices for inter-office movements of inputs, outputs and cash. They generated paper losses, exploited favorable tax treatment of debt and depreciation. The BIG FOUR dominate global tax avoidance industry, in which GOOGLE, IKEA, APPLE, MICROSOFT and many other multinationals pay very little tax on very considerable income. In 2018, BIG FOUR earned around $25billion from tax work globally. PARADISE PAPERS in 2017, PANAMA PAPERS in 2015 and the Luxembourg leaks or LUXLEAKS in 2014 revealed a lot about the tax advice provided by the BIG FOUR in the newly transparent world. LuxLeaks revealed 343 large corporations had used Luxembourg's accommodating tax office rubber stamped deals to minimize, or annihilate their tax liabilities arranged by the BIG FOUR.

The BIG FOUR's failings had become a systemic problem, exacerbated by changes in the profession itself. By 1995, half of US states legislatures had introduced limited liability partnerships, LLP, capping each partner's liability for failings anywhere in the firm at what he or she had put into the business. By mid-1990s the BIG FOUR re-formed as LLPs in low-tax state of Delaware.

The BIG FOUR are perfectly placed to capitalize on the age of big data, with troubling potential conflicts of interest. The firms offer firstly to use client companies' own data to improve their audits and, through that, their audit clients' performance. The promise, in effect, is to update the methods of cost accounting and scientific management for the digital age. KPMG's DATA & ANALYTICS, (D&A), division for example, promises to 'turn data into value'. From becoming strategic advisors to government departments to teaming up with tech companies, the BIG FOUR are to be found at every cutting edge. PwC's tie-in with GOOGLE and KPMG's tie-in with MICROSOFT are typical. The BIG FOUR are where management consultancy and information technology now meet, dominating the cyber-security business, notwithstanding the vulnerabilities in their own sprawling networks that a 2017 attack on DELOITTE exposed. By 2015, the BIG FOUR occupied top spots in cyber-security consulting. Between them, they earned $7.6billion.

The financial accounting systems were not the only problems. There are things profoundly wrong with the way we calculate GNP and GDP, our national income and stock of wealth. These numbers generate alarming anomalies, and yet these numbers continue to rule the policy decisions of governments, financial institutions, corporations and communities. The flawed numbers rule our lives. So sacred is the single GDP figure to the US economy that a complex ritual evolved around its announcement, rivalling in mystique and secrecy the selection and announcement of a new Catholic pope. 12 times a year, chief US statistician and his team lock themselves up in Washington without phones and internet, draw the curtains and carry out a task refined over 50 years to arrive at a single number through the convergence of some 10,000 data streams from recent economic activity in the US. That number must not be spoken out loud. Instead, it is explained in a press release the next day by the US PRESIDENT's COUNCIL OF ECONOMIC ADVISERS. So powerful is this figure that no one must utter it before its official revelation. It is released at 8:30 am the next day. And that presented a unique opportunity for President Trump to capture world's attention with his tweet before the revelation.

But the GDP was not designed for this purpose. It was not conceived to be the primary gauge of the economic health of a nation. It was not created to be a key tool for policymakers and investors. It was not born to govern the global financial markets. As a measure of national wellbeing, the GDP is a deeply flawed summary. It was developed in the 1930s in the United States to have a better handle to get the economy out of recession. Simon Kuznets, one of its creators, warned of the limitations of GDP measures, especially their exclusion of household production and other non-market activity, as well as the many omitted costs of ecological damage of economic activity. Global warming and other disasters are some of the consequences of mis-accounting of micro and macro-economic activity. The internalization of the uniform approaches to estimate GDP by IMF and the WB created global neglect of assessing the cost of damages the developed nations have inflicted on the eco-system. The emerging economies are continuing the abuse of the eco-system at higher and faster rates. The fastest growing doubled its GDP every 7 years in the last two decades of 20th century. The GDP figures, of course, do not include the cost of environmental damage done in the process. On the contrary, actually, as the air quality deteriorates, the resources spent on cleaning the mess and additional health care necessary to reduce the negative impact increases, so does GDP. Some development. Peoples' Republic of China until 1979 tried to manage its economy by a centrally planned model it imported from Moscow. The results were deemed unsatisfactory. And they were. The mis-accounting of economic activities of the centrally planned years created environmental disasters, also matched in the USSR. GDP accounting system was not designed to treat nature as a scarce good, but treated it as a 'free' good with infinite supply to be exploited. Environmental disasters could have been eliminated had they changed their metrics of micro and macro-economic activities. In importing the accounting systems of market economies, the decision makers overlooked the inherent biases and limitations of market based evaluations, prices, and the total neglect of the costs of public goods exploited in economic development that these accounting systems had. Accountants, mostly until recently, have assumed that natural resources are so plentiful that any loss of them is insignificant, not worth worrying to count. They assumed, or were told to assume that natural resources like water, soil, forest and air were free gifts of nature. They did not consider that the natural world could be used up worn out in the way that buildings and equipment can. But just as the 19th Century railway entrepreneurs had to learn that human-made capital, rails and trains, wears out and must be depreciated, so some accountants are beginning to understand that nature's capital is also subject to wear and tear, and worse, depletion. GDP's main weakness lies in the fact that it is insensitive to depreciation of capital assets. From an environmental point of view, this is very critical. It actually can be catastrophic.

GNP accounting reflect key economic flows: production, consumption, savings, investment, but they do not measure the state of capital stocks. Social, human and natural resources, as well as human-made capital such as building and equipment from which production is drawn needs to be included. By selectively focusing on flows the GDP sends misleading signals to policy makers. Activities that maximize production in the short term need not preserve the capital stocks that are central to long-term prosperity. Indeed, focusing just on GDP actually creates incentives to deplete capital stocks because the returns are treated as income. Ultimately, not recording the costs of reinvestments to sustain healthy ecosystems creates and conceals ecological liabilities. Sustainability and climate change are the big challenges of our time. We need to stop denying the escalating environmental problems by leaving environmental costs off our books.

The national accounting system, GDP, only measures 'economic activity', not true income, much less welfare. Rather than separate cost from benefits and compare them at the margin we just add all final goods and services, including anti-bads without subtracting the bads that made the anti-bads necessary. Also depletion of natural capital and natural services are counted as income, as are financial transactions that are nothing but bets on debts, and then further bets on those bets. Since bads have no market value and are ignored, but bads are joint products in producing goods and services, and are everywhere: nuclear wastes, the dead zone in the Gulf of Mexico larger than the size of New Jersey, gyres of plastic trash in the oceans, the ozone hole, biodiversity loss, climate change from excess carbon in the atmosphere, depleted mines, eroded topsoil, dry wells, and exploding debt. Depletion and pollution are the two ends of the throughput needed for the production of goods and services.

It seems that international organizations like the IMF and the WORLD BANK, governments and businesses that are not held responsible for the environmental costs of the damages they inflict have vested interests in GDP measures which emphasize and even exaggerate economic growth. The United States published its first adjusted GDP for depletion of oil and other non-renewable resources in 1994. The figures with their downgraded estimate of US wealth proved so controversial and politically explosive that Congress shut down the program. The lawmakers solved the controversy by shooting the messenger.

From Beijing, the public and private accounting systems of the world do not look like ideal models to import in their totality. Actually, a good number of Chinese eco-system related problems could have been avoided had the decision makers been selective in using market metrics. The changes the Chinese will make in public and private accounting systems are very important with implications beyond their borders. China, for example, is a very important contributor to global warming. By rejecting KYOTO PROTOCOL, President Bush made US position clear on the issue. And so did Donald Trump in 2016 by rejecting PARIS AGREEMENT. The world needs a new leader to offer immediate solutions to a very pressing global problem. The new leader must reform public and private accounting systems to be better metrics of economic activity. We need to understand the new Chinese private accounting system. On firms' balance sheets GOODWILL appears as an intangible asset and represents the differences between the price the company paid to buy another firm and the purchased firm's original book value. BLOOMBERG's estimate of the total GOODWILL for all listed companies in the world was $8trillion in 2018. Its estimate of total physical assets of all globally listed companies was $14trillion. Not surprisingly, the biggest goodwill reporters were mergers and acquisitions, (M&A), junkies. AT&T had $143billion; ANHEUSER-BUSCH INBEV had $137billion; GE had $82billion; BERKSHIRE HATHAWAY had $81billion. APPLE was a rarity. It had little goodwill because it has eschewed big deals. INTERNATIONAL ACCOUNTING STANDARDS BOARD, (IASB), which frames the rules in most countries apart from America, after an ongoing review, is planning a change.

The existing rules are almost identical in America and Europe. When an acquirer buys a firm, it books the GOODWILL, the difference between what the firm has paid to buy the acquired and the acquired firm's book value, on its balance sheet. There is a queasy circularity about GOODWILL. The more companies bid up the price of acquisitions, the bigger the asset they can book. That may be a partial explanation why M&As peek at bull markets. The acquirer then periodically reviews this sum in an impairment test. The revised value is based on new forecasts of the expected cash-flows of the new post-M&A entity. The write-off appears as a loss on the buyer's income statement. Meanwhile, the process of impairment is horrendously subjective.

In the early turbulent stage of the global financial crisis in 2009, leaders at theG20 summit in Pittsburgh decided that the chaotic world of the DERIVATIVES that American law-makers made possible by deregulating them needed to be made safer by ensuring that they are to be centrally cleared. A decade later, the notional value of all derivatives outstanding that are parked as assets of multinational banks globally stands at $639trillion. 68% of them are centrally cleared through a handful of clearing houses. Thus, collectively these institutions contain one of the biggest concentrations of financial risk on the planet.

A subset of these derivatives are traded over the counter, (OTC), by dealers and investors rather than on exchanges. The ECONOMIST[1] finds OTCs worrisome. The notional value of these OTC DERIVATIVES, according to BIS, is $544trillion, of which 62% are centrally cleared, and traders who avoid clearing houses will be financially penalized when new rules are implemented. Hopefully, clearing houses will work as intended if they do not fail. The clearing house is to sit between market participants, and to guarantee that the buyer gets what the buyer bought and the seller gets the payment. Since, cash-equity trades are settled within 2 days, and a party going bust is minimal. But, the lack of transparency of bilateral trade of options stems from the buyers' and the sellers' of the option facing each other for the life of the option, and that played a big part in the 2008 financial crisis. Bilateral trades require each to keep tabs on the other's creditworthiness. When they do not know each other's positions, keeping tabs on the other's creditworthiness is difficult. If the buyer wanted to close its position early, for example, it might sell an offsetting position to another buyer. If all trades centrally clear, however, that would be known to everyone. There will be greater transparency. The raison d'etre of central clearing.

Clearing houses are mostly for-profit institutions. Their profits are expected to rise with their transaction volume, but losses for bad trades are largely to be borne by the members of the clearing houses. That seems to be a standing temptation to lower standards. Skimpy margin requirements or shallow default funds increase the chance that default of a big trade would leave a clearing house with large unmatched positions. That would then need to be covered by 4 possible sources of capital: 1. Its owner, usually an exchange, 2. its members, usually investment banks, 3. its customers, mostly investment funds, 4. The taxpayer in extremis.

Clearing houses have collapsed in the past. A Parisian house collapsed in 1974 when its members defaulted on margin calls when sugar prices plummeted. One in Kuala Lumpur failed in 1983 when palm-oil futures crashed. When the Hong Kong Futures Exchange clearing house collapsed in 1987, the regulators closed the stock exchange while the government and city-state's largest banks arranged a bail-out. The shift to central clearing has been in interest-rate derivatives and credit derivatives. Clearing houses are a new group of financial institutions that are assumed TOO-BIG-TO-FAIL. Without certainty about where a clearing house in distress can seek capital, its members and customers will be more likely to behave in ways that mean it needs that capital. Rules intended to protect taxpayers may have the paradoxical effect of putting them back on the hook. The perpetual MORAL HAZARD problem.

16.Is taxonomy alchemy?

Not many MBA programs offer 20th century French philosophy, if they did, they could certainly benefit from it. Michel Foucault argued that how you structure information is a source of power. Foucault was obsessed with taxonomies, or how humans split the world into arbitrary mental categories in order to tame the wild "profusion of existing things". When we flip these around, "we apprehend in one great leap the exotic charm of another system of thought." But most MBA students are familiar with Daniel Kahneman's THINKING, FAST AND SLOW (Kahneman 2011) that explains how these two systems, fast being intuitive and emotional, and slow being deliberate and logical drive the way we think. Daniel Kahneman's term for Foucault's perception of taxonomies is "framing".

Jeff Bezos, Elon Musk, Warren Buffet and Masayoshi Son understand its importance, and with the expertise of their public relations skillfully manage how outsiders see their firms. By 2015 investors began to see AMAZON as a low low-margin retail business. Mr. Bezos changed AMAZON's image by reframing AMAZON as a high-tech firm, AWS. Its new cloud business produced a consistent and fast-growing cash flow and broke away from serial loss-making. Warren Buffet is an accomplished taxonomist who insists that BERKSHIRE HATHAWAY is neither a conglomerate nor an investment vehicle, but a one-off that can only be analyzed using a special set of rules that he has provided in an "owner's manual". This framing has shielded BERKSHIRE HATHAWAY from scrutiny and criticism over the past decade, even as it has underperformed the stock market. If, of course, you do see BERKSHIRE HATHAWAY as one-off to be analyzed by a unique set of rules.

Masayoshi Son criticized for its weak cash flow and high debt of the telecoms and tech conglomerate began to describe it as a venture capital to be assessed using his venture capital measure of internal rate of return which is both flattering and unverifiable. He has since completed the shift by setting up the VISION FUND, a giant $100billion investment vehicle in London. Elon Musk infers that TESLA cannot and should not be judged in the present by its past performance, but judged in the future. With the help of image managers, by reframing how their firms are classified and subdivided, managers can be successful in changing perceptions, lowering cost of capital when the investors keep on buying their stocks and intimidating competitors. Taxonomies are not alchemy. Eventually the firms must succeed.

Since 1926, most stock market returns in America have come from a tiny fraction of shares claims Hendrick Bessembinder in DO STOCKS OUTPERFORM TREASURY BILLS?[1] Just five stocks (APPLE, EXXON MOBIL, MICROSOFT, GE and IBM) accounted for a tenth of all the wealth created for stockholders between 1926 and 2016. The top 50 stocks account for 40% of the total wealth created. More than half the 25,000 or so stocks listed in America in the past 90 years proved to be worse investments than Treasury bills. The rise that FAANG stocks (FACEBOOK, AMAZON, APPLE, NETFLIX, GOOGLE) have held since 2015 is not unusual. The clout of leading stocks in the S&P 500 has often been higher in the past, but they were not free cash destroyers. A 21st century conundrum. Hendrick Bessembider's results are supportive of another research, which states that most stock returns are made on relatively few trading days. In the first half of 2018, 3 companies AMAZON. NETFLIX, ALPHABET accounted for 71% of DJI and 78% of S&P 500. One of the greatest quandaries of the last three decades has been the way in which reductions in spending on research and development have coincided with an increasing financialization of the private sector. While causality may be hard to prove, it cannot be denied that at the same time that private pharma companies have been reducing their research and development budgets, they have been increasing the amount of funds used to repurchase their own shares, seemingly to boost their stock price, which affects the price of stock options and executive pay linked to such options.

In 2011, along with $6.2billion paid in dividends, PFIZER repurchased $9billion in stock, equivalent to 90% of its net income and 99% of its research and development expenditures. AMGEN, the largest biopharma company, has repurchased stock every year since 1992, for a total of $42.2billion through 2011, including $8.3billion in 2011. Since 2002 the cost of AMGEN's stock repurchases has surpassed the company's research and development expenditures in every year except 2004, and for period 1992-2011 was equal to fully 115% of research and development outlays and 113% of net income. Boosting stock prices does not create value, but facilitates extraction, rewarding stockholders and executives. The problem of stock buybacks is not isolated but rampant. In the last decade, S&P 500 companies have spent $3trillion on buybacks.

A common critique of buy-backs is an inchoate sense that firms buying themselves is unnatural. But actually, buy-backs are like dividends. Cash moves from the firm to its owners. Buy-backs' advantage is their flexibility. Unlike with dividends, stockholders can elect to participate or not, and the firm can turn the tap on and off without disappointing investors. A second claim is that buy-backs create shareholder wealth. Does withdrawing dollars from an ATM makes you richer? No. But, buy-backs can transfer wealth between stockholders. If one sells at a price that later turns out to be lower, it makes the seller wealthier and lower price in the future lowers the remaining stock holders' wealth. Though, buy-backs send signals about managers' intent in allocating capital. They are using cash for buy-backs.

A third criticism is that firms' main motivation is to manipulate either their stock prices or their earnings per share, EPS, which can be cosmetically boosted as the number of shares falls. A fourth is that executive-pay schemes that are designed around EPS, can encourage buy-backs. A fifth concern is that buy-backs lead to low investment. There is supportive data. The firms' cash flow has risen relative to GDP since 1990s, but a lower proportion has been spent on investment.

The sixth claim is that buy-backs are a good measure of whether corporate tax reform was in the public interest. They are not. Better alternatives are whether overall investment rises more than annual tax break, whether firms' wage bills are rising and whether these effects will last. Most criticism of buy-backs is motivated by legitimate concerns about serious problems, including excessively high profits and squeezed wages, concentrated ownership of firms and reluctance of the financial industry to back more capital hungry startups.

The negative signal sent by surging buy-backs is their increasing leverage. 54% of firms had buy-backs more than they earned in the first quarter of 2018. When firms splurge on their own stock, it is a sign of excessive optimism. Note that, last time they did was right before the 2008 crash.

Jan De Loecker and Jan Eeckhout in GLOBAL MARKET POWER[1] using financial statements of 70,000 firms in 134 countries, examined markups (selling prices divided by production costs) and found average markups rose from 1.1 in 1980 to 1.6 in 2016. America and Europe saw the biggest increases. But many emerging markets markups barely rose. In China they fell. That suggests rich-world firms may have been able to increase markups by outsourcing to cut labor costs. Another possibility is that corporate concentration may have increased because of lax antitrust enforcement or the growing heft of companies benefitting from network effects, like internet firms. APPLE's staggering earnings was $60billion, or $8 per person on Earth.

As Peter Orszag, Obama's former DIRECTOR OF MANAGEMENT AND BUDGET, later at CITIGROUP, and Jason Furman, Silicon Barack Obama's CHAIR OF COUNCIL OF ECONOMIC ADVISORS, reported in a research paper that two-thirds of nonfinancial firms that had managed to achieve a return on invested capital of 45% or more between 2010 and 2014 were in either health care or information technology sectors. What allowed such gigantic profits and enormous CEO compensation in these sectors were market power. Silicon Valley saw no need to apologize. Theirs was the great technological and entrepreneurial success story of the late 20th and early21st centuries.

Antitrust, data protection and intrusive tax investigations were, as far as Tim Cook, CEO of APPLE was concerned, nothing more than "political crap", antiquated road bumps on the highway to the future. As tech oligarch Peter Theil of venture capital firm FOUNDERS FUND told audiences and readers, "Creating value isn't enough – you also need to capture some of the value you create." That depends on market power. "Americans mythologize competition and credit it with saving us from socialist bread lines." but Theil knew better. As far as he was concerned, "Capitalism and competition are opposites. Capitalism is premised on the accumulation of capital, but under perfect competition all profits get competed away. The lesson for entrepreneur is clear. Competition is for losers." Theil is a Trump supporter an Ayn Rand libertarian who is critical of government and even education. Each year he offers hundreds of thousands of dollars to encourage students to drop out of college and start companies instead. Silicon Valley has had a core Ayn Rand liberalism that justifies their sense of freedom from any costly social responsibility for the downsides of their products and services. Theirs is an "Greed is good" ethos overlaid with contempt for government intervention and "move fast and disrupt everything" mentality.

It is to the George W. Bush era that dismantled most of the checks on industry concentration and helped to shape the present state of US economy. American industry reached levels of concentration arguably unseen since the original Trust era. A full 75% of industries witnessed increased concentration from 1997 to 2012 according to Gustavo Grullon[1]. The AT&T monopoly which had been forced to divide itself into 8 companies, was allowed to reconstitute itself into VERIZON and AT&T. AT&T bought DirecTV and TIME WARNER. By the middle of the second decade of the 21st century, four companies, General Motors, Ford, Chrysler and Toyota, controlled more than 60% of the automobile market. Five media companies, News Corp., Google, Garnett, Yahoo, Viacom controlled 54% of the US media market. In household appliances manufacturing industry, Whirlpool, AB Electronics, General Electric and LG Electronics controlled 90% of the US market. Oil industry remains to be the most concentrated industry in the world, followed by telecommunications and electrical power generation and distribution industry. Three of the four biggest stockholding companies in the the world are oil companies, ROYAL DUTCH SHELL, EXXONMOBIL and BP followed by ten banks, JPMORGAN CHASE, GOLDMAN SACHS, BOA MERRILL LYNCH, MORGAN STANLEY, CITIGROUP, DEUTSCHE BANK, CREDIT SUISSE, BARCLAYS CAPITAL, UBS and WELLS FARGO SECURITIES. In no other period in history have so few institutions wielded so much economic power over the lives of so many people. Historically, six companies invited political backlash that only twice led to their breakup. First, the EAST INDIA COMPANY, a British private empire involved in opium production and trade supplying Chinese addiction among other equally awful things, lost its long standing legal monopoly over trade with India in 1813. In 1911, US SUPREME COURT broke up John D. Rockefeller's STANDARD OIL, and US Department Of Justice's anti-trust division also initiated legal action against US STEEL, the other giant of the Gilded Age. DOJ went after IBM in 1969, and in 1974 DOJ sought to break AT&T's grip on telecoms, and did. And, the DEPARTMENT OF JUSTICE sued to dismember MICROSOFT in 1998.

17.Are multinationals national companies doing business abroad or are they stateless multinationals of washington consensus in the age of weaponized interdependence of technologic cold war?

Ever since the US$ cemented its role as the world's dominant currency, it has been clear that US's position as the sole financial superpower gives it extraordinary influence over other countries' economic futures. But it is only under President Trump that US has weaponized its financial powers routinely and to their full extent by engaging in financial warfare. That in turn prompted other countries to seek to break free of US's financial hegemony. US is uniquely well positioned to use financial warfare in the service of foreign policy. The US$ I globally used as a unit of account, store of value, and medium of exchange. More than half of cross-border trade invoices are in US$. That is 5 times US's share of global goods imports, and 3 times its share of exports. The US$ is the reserve currency of central banks and the currency of capital markets, accounting for close to two-thirds of global securities issuance and foreign-exchange reserves. The world's financial rhythm is American. When US$ interest rates move or risk aversion at Wall Street shifts, global markets respond.

The global financial plumbing after 9/11 channels most of international transactions to be cleared in New York by US "correspondent" banks. US has a tight grip on the main cross-border messaging system used by banks, SWIFT. Another part of the US centric network is CHIPS. CHIPS is a clearing house that processes $1.5trillion worth of payments daily. US uses these systems to monitor activity. Any organization's access denied to this infrastructure isolates the organization and most likely financially cripples it. Individuals and institutions all over the world are thus subject to US jurisdiction and vulnerable to US inflicted punishment. In 2014, a $9billion penalty against BNP PARIBAS shook the French establishment. BNP PARIBAS had avoided being permanently banned from clearing dollars, the closest thing to commercial death for international lenders. America wield more clout than other states because its money is so central to the system. The dollar represents half of the cross-border interbank claims, a proxy for international payments, and 62% of central bank reserves. There was a rush to buy dollars during 2007-2008 sub-prime crash, even though Wall Street caused it. Another rush in March 2020 during America's bungled response to covid-19.

To outsiders, dollars are an attractive asset they use for cross-border purposes. For America, foreign ownership of its notes is like a loan from abroad. Demand for dollars allows it to finance deficits with its own currency instead of forcing its residents to spend less. That reduces the elemental need to balance the money that comes in with what goes out, freeing America to pursue the monetary and fiscal policy it wants. The autonomy, as well as the world's dependence on dollars, gives it leverage. America can extract concessions by rewarding allies with vital liquidity while denying it to foes. Robust demand for the dollar boosts its value relative to others, though hurts its exporters, but cheapens its imports. Monetary clout grants influence on international regulation. President Trump has taken weaponizing finance to a new level by using sanctions to throttle Iran, North Korea, Russia, Turkey, Venezuela and others. His arsenal also includes tariffs and legal assaults on companies, like HUAWEI. "Secondary" sanctions target other countries' companies that trade with blacklisted states.

The American tech company, QUALCOMM, doing 65% of its business in People's Republic of China, with most of its profits in 2017 booked in Singapore to minimize their taxes in the Unites States, convinced the Trump administration in March 2018 to block a hostile takeover by BROADCOM, another tech company listed in the United States but domiciled in Singapore for tax efficiency, on the grounds that QUALCOMM's independence was vital to ensure America's strategic technical supremacy over China. The predator, BROADCOM, on 11/2/2017, four days before its hostile bid, announced to shift its legal base to the US. President Trump's veto of the hostile takeover of QUALCOMM by BROADCOM for $117billion was one of the most aggressive applications of COMMITTEE ON FOREIGN INVESTMENT IN THE UNITED STATES (CFIUS).

This action was unusual in two respects. It was a hostile take-over, so there was no agreement in principle between buyer and seller for CFIUS to consider, and therefore no opportunity for mitigation by the parties. With that veto the Trump administration weaponized CFIUS. On August 13, 2018, President Trump signed into new legislation designed to strengthen the role CFIUS and to force it to give greater weight to national security considerations compared to the prior open borders approach to direct investment. This new law was FOREIGN INVESTMENT RISK REVIEW MODENIZATION ACT (FIRRMA) expands the types of transactions requiring CFIUS approval and introduces new categories subject to review, including "critical materials", and "emerging technologies". FIRRMA creates a white list "identified countries" that would not be subject to the new strict scrutiny due to their friendly relations with the United States, including parties to mutual defense treaties. What is new is that President Trump is refusing to play the free-trade game any longer. The United States will match China, Germany, South Korea and other countries with trade surpluses tariff for tariff and subsidy for subsidy.

President Trump has exposed China's vulnerability to the dollar-centric financial system. America's ability to blacklist or hobble Chinese tech firms ultimately rests on punishing suppliers and other counterparties who do business with them through the dollar-based banking and payment system. Using the US$ to extend the reach of US law and policy fits President Trump's "America First" credo. But, other countries view it as abuse of power. US's allies worry more about the US's role as guarantor of orderliness in global commerce. It may eventually lead to the demise of US's financial hegemony, as other countries seek to dethrone the mighty US$. The EU's main initiative has involved Iran. It has tried to create a way for its banks and firms to trade with Iran while shielding them from US imposed sanctions. INSTEX, a clearing house created for this purpose by Britain, Germany and France is limited. It is essentially a barter mechanism and does not cover oils sales. It is limited to non-sanctioned humanitarian trade. It was structured to allow firms to engage in commerce without resort to US$ or SWIFT. They have stayed away for fear of incurring secondary sanctions. The limited nature of INSTEX reflects the sheer scope of US's reach. The new age of international monetary experimentation features the de-dollarization of assets, trade workarounds using local currencies and swaps, and new bank-to-bank payment mechanisms and digital currencies.

China has developed its own domestic payments and settlement infrastructure, called CIPS. Launched in 2015, it has complemented SWIFT which it uses for bank messaging. It is processing less in 2018 than SWIFT does each day. But it simplifies cross-border payments in yuan, giving banks lots of nodes for settlements. Reports suggest that China, India and others may be exploring a jointly run SWIFT alternative. Chinese digital-platform companies have globalized faster than Chinese banks, and parts of the world's consumer-finance system are coming under Chinese payment systems. In capital markets China introduced a yuan-denominated crude-oil futures contract. The Patrıot Act passed after 9/11 allowed the US Treasury to label foreign banks as threats to financial integrity and to ban them from the system for clearing dollar payments. In 2001-2003 America won the right to monitor SWIFT, which originally was the confidential global bank messaging system. Between 2002 and 2008 the Treasury experimented with minor offenders. It brought to heel Victor Bout, an arms dealer; Banco Delta Asıa, a bank in Macau that traded with North Korea; and Nauru, a Pacific island with a sideline in exotic finance. Then went after a state owned Turkish bank, Halk Bankası. Since 2008 Western banks have been fined for breaking American rules in the past, but not banned from dollar clearing. The US Treasury accused Banco Delta Asıa of laundering money for North Korea, prompting depositors to panic, other banks to keep their distance and Macau government to step in. The US Treasury subsequently barred American financial institutions from holding a correspondent account for the bank, excluding BDA from the American financial system.

"It is hard to escape the long arm of the dollar" was proven. Dollars dominance reflects what the economists call network externalities. The more people use it the more useful it becomes to everyone else. The dollar also benefits from a hub-and-spoke model for the exchange of currencies, the invoicing of trade and the settlement of international payments.

The global financial system is like a sewer and all of the pipes run through New York. This gives US TREASURY great punitive power and jurisdictional reach. However, not all dollar settlements are subject to American jurisdiction. It is possible to clear dollar payments in Tokyo and Hong Kong and elsewhere. But America's FEDWIRE and CHIPS, handled transactions were worth $4.5trillion a day in 2017. Hong Kong's system which runs through HSBC dealt with .8% of that amount. More over the ability of offshore dollars (Eurodollars) to enter and leave the American financial system if necessary is vital to their appeal. The liquidity of Hong Kong's system is buttressed by ~~HSBC~~'s ability to handle dollars in New York.

China is developing its own international payments system based on its currency. Russia and China have agreed to increasingly conduct trade in their own currencies, rather than US$s. President Trump's withdrawal from the Iranian deal Obama and American allies have concluded increased trading in in RMB-denominated oil futures contracts China launched in Shanghai recently. PETROYUAN is seen by some as a potential rival to the US$ in pricing oil. OPEC's price of its exports is still in US$, and OPEC's global exports are a very large part of international trade. Increasing crude oil trades in currencies other than US$ will result in gradual de facto de-dollarization of global finance.

China has some of the building blocks to become more autonomous. It has its own domestic payments and settlements infrastructure called CIPS. Launched in 2015, it has so far complemented SWIFT which it uses for interbank messaging. It simplifies cross-border payments in yuan, giving banks lots of nodes for settlements. Central banks of India and China are reported to be exploring a jointly run alternative to SWIFT.

At the end of 2017, ZTE was the world's fourth biggest telecoms-equipment maker, with an enterprise value of $17billion with a Chinese state owned enterprise, (SOE), as its main stock-holder. ZTE's US sales were only 15%. On 4/26/2018, the US DEPARTMENT OF COMMERCE banned American companies from supplying ZTE with components for 7 years. ZTE had admitted trading with Iran and North Korea and lied about remedies it had put in place. ZTE's stocks were suspended temporarily. Though, subsequently the Trump administration softened its position.

Companies that break the law or act in concert with banned governments do not deserve sympathy. But there are unsettling concerns drawn from US government use of such weapons against big foreign companies. First, any large company can be reached. No fewer than 2,000 big companies outside America issue dollar bonds. The total dollar debt owed by companies outside America is over $5trillion. Cross-border supply chains mean most firms rely on American tech components in some way. Second, these powers can be misused, either for overtly political end or because they are badly calibrated. After ZTE, the global business community worried that HUAWEI could be next. And was in December 2018.

IT supply chains are highly specialized and globally tangled. Cutting companies off, WEAPONIZING INTERDEPENDENCE, in military jargon, can cause serious disruptions. HUAWEI is China's most prized high-tech company. Its name proudly translates as "Chinese achievement". $150billion revenues put HUAWEI in the same league as MICROSOFT. SAMSUNG is the only company that sells more smart-phones. In superfast 5G mobile networks, HUAWEI is a global forerunner with valuable patents, and has the largest manufacturing capability of telecoms equipment in the world. Its demise can cause shock waves that would rattle all of the tech world. On May 15, 2019,

President Trump barred American firms from using telecoms equipment made by firms posing a "risk to national security". His was a seismic decision. All technology firms are highly interconnected. No technology firm is an island. On May 20, GOOGLE announced its decision of stopping to supply the proprietary components of its ANDROID mobile operating system to HUAWEI. INTEL, QUALCOMM, and MICRON have also joined GOOGLE and announced their decisions of stopping sales. Interdependence, we are told, cuts both ways. HUAWEI is a very important buyer of American high-tech. QORVO, the maker of wireless communication chips derives 15% of its revenue from HUAWEI. HUAWEI is also an important customer of MICRON.

INFORMATION TECHNOLOGY & INNOVATION FOUDATION estimated the cost of export controls to American firms to be $56billion in lost sales over 5 years[1]. The stock prices of American technology companies fell as a result. TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, (TSMC), announced its decision to continue supplying HUAWEI. Last few years HUAWEI has consciously made strategic moves to become less reliant on American proprietary technology by increasingly making use of chips designed by HiSilicon, its in-house chip-design unit that TSMC produces for HUAWEI. Chinese chip factories are not capable of manufacturing HiSilicon's sophisticated designs. Despite years of efforts to be self-sufficient by manufacturing its own computer chips, China spent more in 2018 on importing chips than it did on importing crude oil. In the globally tangled chip-industry supply-chains, many non-American companies make use of American parts and intellectual property. They may therefore consider themselves covered, wholly or partially, by the American ban. ARM, a SOFTBANK owned British domiciled company, whose technology powers chips in virtually every phone in the world, including those made by HiSilicon, announced its compliance with the COMMERCE DEPARTMENT's rules. That suggests that ARM will not grant HUAWEI new licenses. It is not, however, clear whether ARM will support existing licenses.

A return to business as usual seems unlikely even when the ban is lifted in exchange for trade concessions. President Trump's administration have to has twice demonstrated a willingness to throttle two big Chinese companies. Trust in American technology firms has been eroded. China has committed billions of dollars to efforts to boost its domestic capabilities in chip-making and technology. If the ban is, on the other hand, a tactic of the strategy of the US campaign to take down HUAWEI, HUAWEI will need to look for alternative chips and software that Chinese suppliers will try to provide. The Chinese IT companies do not seem to have other options. The global supply-chains put in place with American leadership look vulnerable. Interdependence that can be weaponized is weaponized to "Make America Great Again". Global supply-chains' vulnerabilities are exposed. Like the Japanese earthquake and tsunami induced wake-up call exposing the rigid interdependencies of the globalized supply-chains. As, generally, is the pattern in developing economies in their catch-up phase, the Chinese domestic microchip industry started at the lower-value end of the process. Its comparative strength lies in assembly and packaging chips. Dozens of firms around Yangzi delta near Shanghai, for example, specialize in this sort of work. JCET, TIANSHUI HUATIAN, and TFME are better known ones. In the age of TECHNOLOGY COLD WAR, China is turning to design and manufacturing. Chinese firms critically rely on modifying designs from ARM. The SOFTBANK owned company's chips dominate the mobile-computing business and probably will be able to be a major if not a dominant supplier of smart devices that will make up INTERNET OF THINGS. According to company releases, ARM has plans to enter high-powered CLOUD-COMPUTING chips market.

Making progress in manufacturing high-tech chips turned out to be arduous for the Chinese companies. The Chinese up-starts face tough competition from incumbents in other countries with intimidating accumulated know-how of the best army of most trained engineers with decades of experience. Manufacturing is the most demanding part of chip making to replicate. The semiconductor manufacturing industry is about repetitive cycles of learning. HiSilicon's Kirin 980 was first smartphone chip to be produced on the 7-nanometer node, the current state of the art for squeezing in computer power. TSMC of Taiwan had the needed technology. Like APPLE and QUALCOMM, HiSilicon, had to have its chips manufactured in Taiwan, by TSMC. Furthermore, there were 29 companies with advanced fab facilities in 2001 after consolidation there are 5 in 2019. The suppliers of equipment for these fab facilities are even fewer. The Dutch, (ASML), is the dominant supplier of extreme ultra-violet lithography. President Trump's tweets grumble about Chinese companies' pilfering American intellectual property. The idea that Chinese firms have some technology companies of their own to offer may seem unrealistic propaganda. Actually, Western technology firms increasingly show interest in Chinese tech. In some cases, they bought Chinese rivals outright. Such acquisitions date back to 2016. Most deals were small and involved niche industries. Maker of power-trains and sensors for electric vehicles, or agencies managing social-media influencers. The French FAURECIA, leading global supplier of vehicle interiors, acquired JIANGXI COAGENT ELECTRONICS, which develops human machine interfaces in 2017. In 2018, XILINX, an American chip-maker acquired DeePhi Tech, a machine-learning start-up in Beijing. All told, American technology companies have invested $1billion in Chinese since January, 2018, according to DEALOGIC, a data. provider Chinese tech firms invested nearly four times as much, $3.8billion into those in America. In 216, APPLE put $1billion into DIDI CHUXING, and MICROSOFT took a stake in LAIYE, an Ai BUTLER that handles voice commands through an app. INTEL has taken stakes in several start-ups, including, in 2018, a cloud-service provider and in 2019 a firm that writes software for cashier-free stores.

In 2018, ALPHABET paid $550million for a stake less than 1% in JD.com, the e-commerce competitor of ALIBABA. NVIDIA, an American maker of Ai chips, invested in WeRide.ai, a Chinese self-driving tech, and TuSimple, an autonomous-truck stat-up. In 2018, INTUITIVE SURGICAL, a robotics company, took a stake in BRONCUS, a Chinese start-up.

In the last ten years or so, China has blocked only one foreign acquisition. And, that was COCA COLA's $2.4billion bid for HUIYUAN JUICE, a soft-drinks company in 2009. In 2018, the Chinese "negative list" of areas where investments are restricted shrank from 63 to 48 industries. Chinese regulators surprised many by not blocking DeePhi, despite how strategic its technology could turn out to be defense related and thus un-acquirable.

In 2017, the Treasury considered sanctioning CCB and AGRICULTURAL BANK, two very big Chinese banks. According to BLOOMBERG the two Chinese banks have $344billion liabilities. Sanctions could be unsettlingly counterproductive. A realistic concern is that some countries will try to develop ways to escape America's dollar reach. Careful studies of the Treasury's implementation of its new soft-power of weaponized interdependence offer a step-by-step guide what a country needs to survive without America's permission: semiconductors, several global currencies, and clearing system, credit rating agencies, commodity exchanges, a pool of investors and shipping companies.

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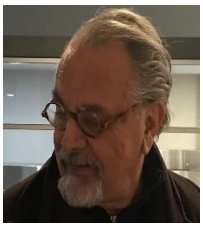

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