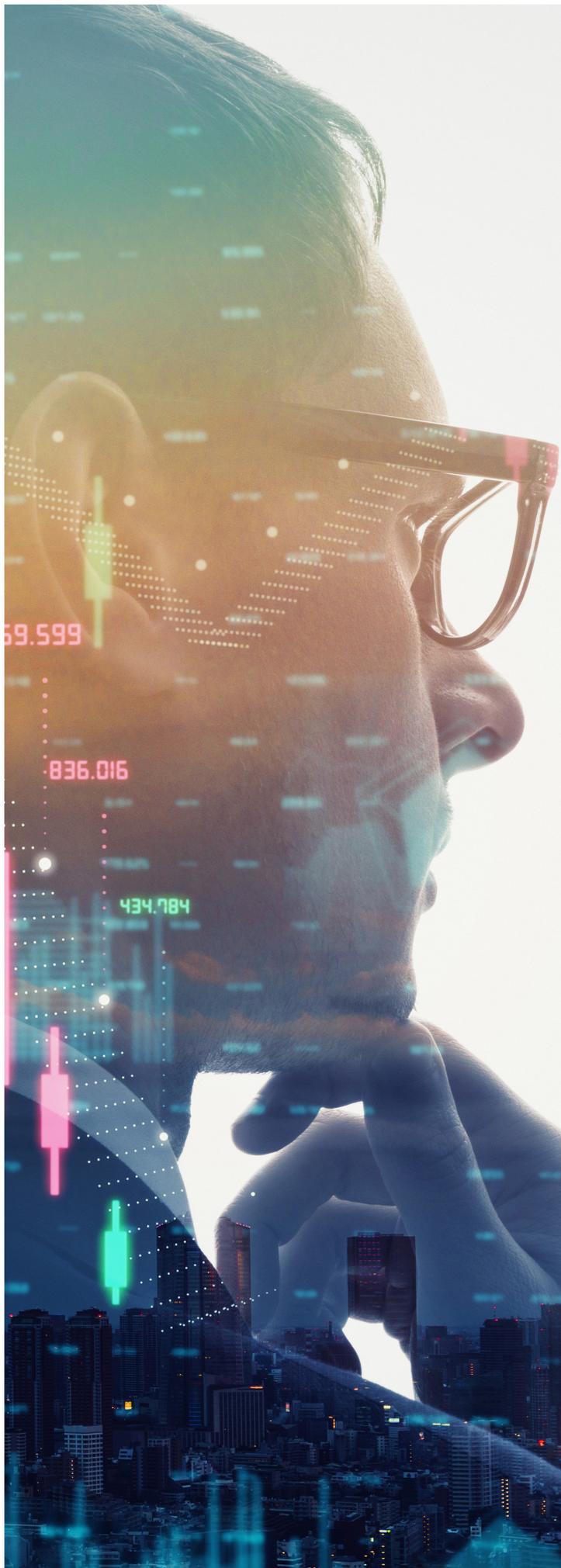


The logo for Periculum, featuring a stylized 'P' in a teal color followed by the word 'ericulum' in white. Three small teal squares are positioned above the 'm'.

NEW MARKETS, NEW MODELS

Aligning Credit & Liquidity
Risk Management to New
Market Realities



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INTRODUCTION

The birth of the production line changed history. In 1913, during the 2nd Industrial Revolution, Henry Ford installed the first moving assembly line for mass production automobiles.¹

Prior to the assembly line, auto workers worked as teams to produce a single car, taking more than 12 hours to complete. But the assembly line brought this number down to two-and-a-half hours,² changing the future of manufacturing and leading to Ford Motor Company's growth as a frontrunner in the industry.

That's only part of the story though. The other part is what happened to manufacturers who refused to transition to this new way of production or those who could not raise the investment capital necessary for the many parts needed to build assembly lines. Their stories are not as long as Ford's 117-year history, and it is their precautionary tale, along with the current global economic situation and the 4th Industrial Revolution, that catalyse discussions about liquidity and credit risk.

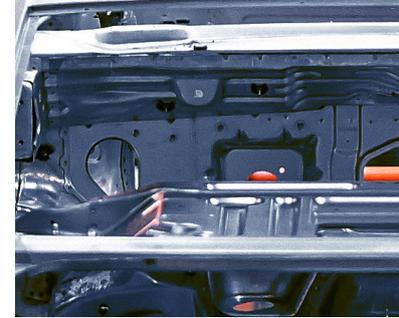
Several changes have led the 4th Industrial Revolution including:

- The rapid development of new capital-intensive industries (i.e. technology)
- The accelerating transfer of power to the east
- Technology-led disruption to legacy industries, such as the transition to renewables within the energy sector
- A shift in economic fundamentals driven by intergenerational beliefs, new monetary policy standards, and growing influence of rising economies like China, Russia, and India

These changes are to companies as Ford's assembly line was to the automobile industry – disruptive to the established methods of operating and forecasting.

Historical economic models existed to forecast the probability and impact of future economic deteriorations to shield companies, but they are no longer sufficiently reliable. New methods are essential so companies can test their preparedness and ability to withstand financial risks in times of instability, rapid innovation, and increasing frequency of severe tail events (i.e. major supply chain disruptions like China's rare Earth restrictions imposed in 2012³).

The core of addressing the deficiencies in historical models is ensuring companies have the ability to predict how consumer behaviours and changing markets will affect exposure to credit and liquidity risk. Ultimately, it will be understanding these risks and ensuring financial flexibility to make appropriate adjustments which will impact company survival during the 4th Industrial Revolution. This requires a fresh approach to credit and liquidity planning that is more predictive and uses new models to remain profitable.



FACTORS CREATING UNRELIABLE MODELS

Historical forecasting models are affected by several factors that reduce the ability to accurately predict future liquidity and credit risks. Of these, three primary factors have emerged:

-  A shift in manufacturing powers from the West to the East
-  Innovative and disruptive technology speeding up product and service delivery
-  New industries whose behaviours and impact are not accounted for in historical models (i.e. The “gig economy” and the technology industry worth \$5.2 trillion⁴)

Manufacturing powers moving to Asia

Shifting power has affected legacy industries and devastated local economies. In the 1970s to 1980s, the Steel Belt became known as the “Rust Belt”, a concentrated area of manufacturing in the U.S that declined in part due to jobs moving overseas to countries that provided a variety of perks. Today, some companies aim their manufacturing for Asia entirely, never looking to the West at all. More progressive countries cannot compete with the low wages and local

governments that cover costs of energy, transportation, and infrastructure, and offer significant tax breaks, among other benefits.

Five Asian countries now top the list of the 10 highest industrial producers (Figure 2) in 2019 with 43.9% of total worldwide production.

2009 Total Industrial Production by Country

USA, \$283T; China, \$247T; Japan, \$157T; Latin America & Caribbean, \$107 T; Germany, \$96,8T; Europe & Central Asia, \$90,6T; Brazil, \$52,1T; South Asia, \$52,1T; Italy \$50,2T; Russia, \$48T.

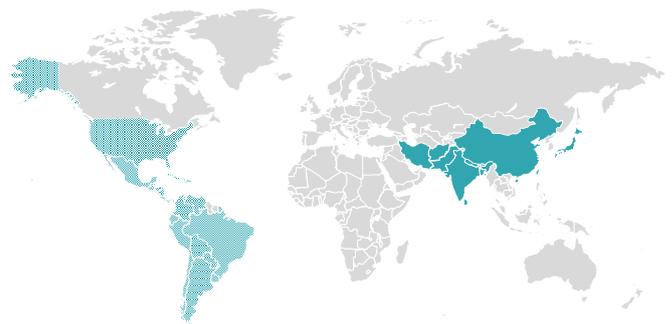


Figure 1

This marks a significant change from the numbers a mere 10 years ago which show three countries and a grouping (“South Asia”) accounting for 33.8% of worldwide production (Figure 1). In 2009, the U.S. was still the top industrial producer, but since then, they have steadily produced less than China. Further, in 2009, the U.S. only led China by \$3.6 billion, but in 2019, China led the U.S. by \$2.24 trillion,⁵ signalling a significant shift in economic power.



2019 Total Industrial Production by Country

China, \$571T; USA, \$347T; Japan, \$176T; Germany, \$117T; India, \$67,9T; Russia \$62,5T; Italy, \$51,7T; Indonesia \$49,7T; United Kingdom, \$49,6T; Brazil, \$49T.



Figure 2

The impact of this shift is not accounted for in many historical models that forecast liquidity and credit risk. Most microeconomic models are based on the quality of legal institutions, including those that protect employees. Because these models do not consider that companies are now more reliant on a supply chain focused in a geographic region that experiences political and environmental turmoil regularly, there is a need for new models that include these factors and their impact on manufacturing.

Increasing speed of product releases

In the past, companies had a longer product lifecycle as ideation, product design and production processes all took considerable time to complete. Today's automation and instant communication systems have reduced both the complexity and the impedance of deciding and acting quickly, as evidenced by the app boom (among others).

While apps have a history that stretches back to the 1970s with built-in programs

like the game “Snake”, apps as we know them now were launched through the App Store in 2007. At that time, 500 apps were released for download. By June 2011, there were 425,000 apps available.⁶ In 2019, that number was 2.57 million.⁷

Prior to the release of smartphones, apps had to be built into phones, which required programming, upfront planning, and engineering. Now, however, app builds take a concept, money, and a programmer. This has led to a proliferation of programs dedicated to almost every segment of life – games, entertainment, productivity, shopping, investing, banking, and more. Even legacy industries are turning to apps for new sources of revenues such as Siemens’ Mindsphere platform which delivers valuable sources of data that improve the efficiency, performance, and financial returns of assets and has contributed to around €5.2 billion in revenue.⁸

Because of the changes in technology that allow for quicker to-market products and services, the business lifecycle no longer looks the same for many industries – some periods may go quicker while some will go slower. As the speed at which products are released continues to change, companies need to maintain flexibility in the market to deliver, sustain, and adapt their offerings. Historical models typically look at past trends, but these new trends and patterns require fine tuning of models to obtain sufficient data to forecast success, and consequently, the impact on credit and liquidity risks where success is not achieved in the desired manner (i.e. in the case of changes in external factors during the product development process).



Modern risks in new industries

Operating on unreliable historical models means companies are not prepared for financial risks and developments in emerging industries, making the company less resilient against a downturn in the market.

Trading apps are one advancement that has influenced the need for new predictive models in the finance industry. Several years ago, trading platforms were sure of their competition, and the path to entry was more complicated for new entrants.

Now, trading apps burst onto the scene, making it quicker and easier for less savvy investors to participate, and often offering zero percent trading fees to entice traders. This is pulling traditional trading brokers into an inevitable price war as these new companies are up to 20 times cheaper than the four largest traditional platforms.⁹

Due to their infancy, emerging industries (like the share economy, technology disruptors, and subscription services) lack historical data to identify patterns of disruption and determine risk. Investors in traditional industries would typically have valued a company on historical data in order to anticipate the monetary direction and capabilities of the company. Despite a lack of historical reference to determine prospects, emerging industries gain investors without making profits – sometimes for years.

For example, a major ride-share company achieved a market cap of \$75.5 billion when it went public. However, investors looked at the company to determine its potential, not its profitability. Prior to going public, the company had a tumultuous 10 years in service, recording several loss-making years.¹⁰

There is less reliance on fundamentals in new industries and an increasing emphasis on the potential of a company based on predictive analysis and investor sentiment, as shown in the buying and selling of cryptocurrency, specifically bitcoin. Though it has experienced fluctuations in value, people continue to buy and use it.

There is no historical model to predict what bitcoin will do, nor are there enough underlying assets to sell if issues arise with the shares. **This type of “speculative investing” is risky – if it fails, a majority of capital will be lost.** Making the situation even more volatile, cryptocurrencies are subject to “narrative economics” – the effect of viral stories. Negative PR can make the price tumble instantly.





“Narrative economics” are another modern risk not connected to historical models. Social media brings news into the hands of consumers within minutes, and this can instantly hit companies through their share price. Most forecasting models do not yet account for the power of social media. For example, a 2019 holiday ad from an exercise bike company went viral for suggested undertones of misogyny and privilege in the video. After the ad received widespread attention, the stock prices initially surged by 5%, but the next day, the stock prices dropped 7%.¹¹

Emerging industries challenge not just financial forecasting models, but also strategic, reputational, and operational models. They require scenario testing and fresh thinking to determine the level of liquidity and credit risk a legacy industry may experience as the emerging industries start, fail, or settle into the market.

Driven by a shift in manufacturing power, accelerated product releases, new industries, and narrative economics, historical models are losing credibility and exposing companies to unforeseen sources of credit and liquidity risks. In addition to these changes, there are many risk factors – geopolitical, strategic, and financial – that require companies to consider current and future methods to forecast the needs for future capital and to maintain liquidity in the future.

In short, we believe the pace and aggregation of change in capital markets forces the need to rethink the adequacy of business and forecasting models to prevent and adapt to changes in credit and liquidity risk.

“

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RISKS IN AN ECONOMICALLY CHALLENGING TIME

Prior to the 2008 recession, some experts began warning about its inevitability – telling clients that the housing bubble was going to burst, a bear market was coming, and the risk and leverage in the system were too high.¹²

Expansion has resumed and sustained in the 10 years since the market began its recovery from the Great Recession, leading many to wonder when the next recession will hit, especially since halfway through 2019, an indicator of an upcoming recession appeared when the treasuries' 3s5s yield curve inverted.¹³

Though there are no perfect systems for predicting a recession, economists and experts are looking at the signs with concern. It's not a question of "if"; it's the questions of "when", "where", and "how deep"? Geopolitical, strategic, and financial threats are among the risks to economic stability, and it is these uncertainties that are calling for companies across industries to examine their credit and liquidity positions to bring in new predictive models to offset an eventual recession.

Geopolitical risks

Brexit

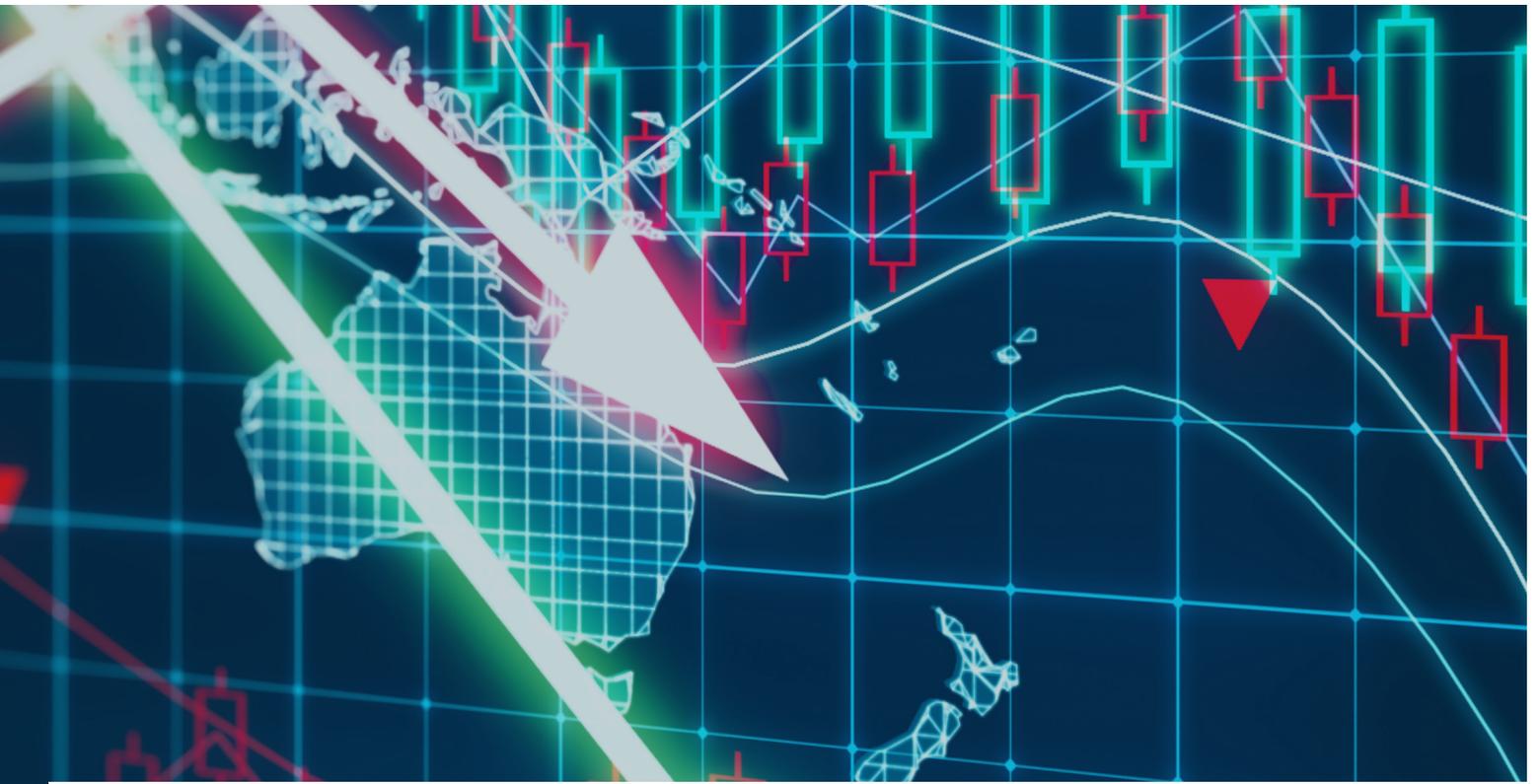
A tumultuous 2019 saw the finality of Brexit with the UK officially exiting the European Union (EU) on 31 January 2020. Throughout the process, speculation flourished – what would happen to trade, immigration, and investments if the UK left the EU without a deal? Though officially removed from the EU, the UK has entered a transition period for 2020. Prime Minister Boris Johnson said walking away from negotiations is still an option.

As no-deal concerns begin to climb again, the British currency is volatile.¹⁴ At the same time, the EU has decided to become "more assertive on rules enforcement and retaliatory tariffs" and to "defend itself more aggressively against competing economic and political models".¹⁵

U.S./China Trade War

The U.S./China Trade War of 2019 left farmers and manufacturers struggling and depressed business confidence and investment. Though the trade war shows signs of de-escalating (with the very real threat of escalating again at a moment's notice), the manufacturing sector is in a mild recession, and there are signs the economic damage is not only expanding to other sectors but resulting in long-term troubles.¹⁶

For example, the German automobile industry, a primary pillar of Germany's exports, is facing a downturn after a decline in the Chinese market due to the Trade War, stricter regulations, and global pricing pressure.¹⁷ The Chinese buying market was strong for many years, and German car makers leveraged that economy to maintain their profits. However, tariffs on imports and rising rents led to more cautious Chinese buyers. At the beginning of 2019, car sales had fallen for nine straight months, but since then, German automakers have rebounded in China. The uncertainty they experienced exemplifies geopolitical risks that can harm companies.



As countries make moves to more nationalist attitudes, like the U.S.'s attempts to bring manufacturing back from the East and the UK exiting the European Union, companies must be prepared to navigate aggressive political tactics that could affect their ability to maintain their current business model, raise capital on a global level, and minimise risks to their liquidity and credit profile.

Strategic risks

Choosing where to place investments in an economically uncertain time is made more difficult by rapidly developing industries. Products are advancing so quickly that companies cannot become stagnant with decision-making processes. Instead, they should maintain an environment in which their business model can swiftly adapt to changes. Whether it is dirty energy moving towards clean products, the automobile industry producing battery-powered and self-driving cars, or the future of mobile technology, companies need to have the capital necessary to position themselves for sustainable growth, portfolio diversification, and expansion and place investments accordingly.

Financial risks

With many experts predicting a downturn soon, uncertainty follows. We all know economic peaks and troughs are inevitable. Will companies who need liquidity and cash to invest in the future have the money to take strategic risks? While many companies will take on debt to finance

capital-intensive product or service developments, this additional debt leaves them with little flexibility. As credit becomes constrained during an economically challenging time, there will be reduced capacity for capital intensive investments with a long-tail return.

During an economically challenging period, companies need to look at other ways of raising less financially risky capital than taking on debt. For example, prior to the 2008 recession, Greg Lippman, sensing the recession – and predicting the housing bubble – got permission from Deutsche Bank to buy protection on \$1 billion of mortgages. He looked for ways to offset a financial crisis that many mocked as career-ending.¹⁸ But his bet paid off, and it made \$1.5 billion for the bank.¹⁹

Risks, whether geopolitical, strategic, or financial, need to be leveraged to the best advantage in an economically challenging time. New predictive models can assist in that decision-making process.



Will companies who need liquidity and cash to invest in the future have the money to take strategic risks?

LIMITS OF HISTORICAL MODELS AND TOOLS

Previously, companies would choose to take on as much debt as they could to fund expansion, and because of tax exemptions and interest payments, they could return as much money as possible to their investors, which included capital lenders.

This made leveraging to the max beneficial to shareholders and to the company as it created new products or services. However, in the current economic situation, and with unreliable models for forecasting the impact of changes in economic output to their future credit and liquidity risk profile, companies should consider some of the limitations of frequently used historical models, which will alter in relevance given industry and level of disruptive exposure covered within this paper.

Optimal level of debt

Companies face numerous tough decisions, and one of them is choosing their level of debt. Traditionally, it is believed that by increasing leverage, the company should grow at a higher pace. So, the most optimal level of debt for a company would be the one that makes their WACC the lowest, which makes the borrowing of money cheaper.

By lowering the cost of borrowing, companies can turn this money into positive investments and accelerate their future growth. Despite being correct in theory, there are numerous other factors that companies should consider before deciding how much debt they could take:

- Growing too fast may be difficult to sustain
- The debt repayment liabilities are higher the higher the leverage
- If a higher debt level is not supported by an equivalent rise in net income to cover the costs of credit, the company can suffer from serious credit and liquidity problems

With numerous uncertainties that could negatively affect the company, scenarios should explore and understand potential exposure to severe, but plausible, risks that could impact the company's credit and liquidity profile, and quickly alter the company's cash position where needed. In addition, the company may need to take on more debt in the future to remain flexible in its business model rather than taking on debt before it is necessary. For example, with technology accelerating innovation, products may

become obsolete abruptly. It is, therefore, important that companies keep capital-raising options open in order to retain flexibility to diverge into new models.

Sharpe Ratio

As one of the most common ratios, the Sharpe ratio helps investors understand a potential return from investment in relation to the associated risk.

The Sharpe ratio essentially tells an investor how much excess return can be obtained by taking additional risk. Its calculations are based on finding historical data about the expected return and the standard deviation for an investment. In a swiftly changing economy, with rapid technology advancements, easterly shifting data, and highly saturated competition, the historical data might not be a reliable proxy to predict the future.

The Sharpe ratio has other limitations as well, including:

- Price volatility is assumed to be equally risky, however, returns are skewed away from the average (of past performance) due to many unpredictable changes in prices, especially in fast-moving environments where prices can decline rapidly and products become obsolete instantly.
- The debt repayment liabilities are higher the higher the leverage
- By taking a shorter period for measurements, results can be manipulated to show the standard deviation for the shorter period with lower volatility, which could lead decision-makers down the wrong path. This may end up being fatal for a company. Sensitivity tests should be used, showing a wide range of data, to prevent misleading outcomes.

Companies can bolster their historical models with a firm risk tolerance threshold in which they leverage up to a certain percentage of sales revenue based on their risk appetite. They should also consider new models to assess liquidity and credit risk and find strategic options to avoid or reduce harm.

NEW MODELS FOR CHANGING MARKETS

With the increasing number and complexity of factors that are individually and collectively altering their credit and liquidity position, companies need new models to reliably predict future credit and liquidity risks.

New models that include the following will allow reliable investment decisions, improve sustainability, and boost preparedness to navigate changing economic conditions:



Advanced forecasting and machine learning



New business models for adjusting to new competitive forces



New strategies for assessing the sustainability and returns of strategic and operational investments



Changing customer expectations led by new market entrants

Companies also have the task of linking new models to reliable, forward-looking predictions of credit and liquidity risk, and then testing them against severe, plausible scenarios to assure the Board of Directors and investors of the company's ability to succeed amidst an accelerating 4th Industrial Revolution. The following case studies illustrate how a shift in technologies and industries has led to the development of new markets and created the need for innovative approaches to forecasting and monitoring liquidity and credit risk.



Investment Management Industry

Summary

The financial services industry is experiencing major disruption, particularly in investment management. The rise of fintech (innovation and technology that competes with traditional financial methods in delivering financial services) has increased competition and introduced a new consumer who wants cheap, or free, investment options and the freedom to invest digitally. These consumers want ease of access. They are savvy. They don't always need an investment manager because they feel confident not only in their own investment abilities, but more so, in the platform with which they are trading. These changes have brought about massive consumer pressure on reducing fees despite the increasing cost of regulation and running a company, the tremendous investiture of updating legacy systems, and loss of positive staff morale due to declining bonuses.

The proliferation of these trading platforms has provided consumers with the ability to easily open and access trading accounts; therefore, investment management companies are having serious trouble attracting new clients, especially the newer generations of investors. To address this, legacy investment giants possess the capital to squeeze out smaller legacy players by absorbing fintech companies, like the recent acquisition of a popular online stockbroker by a Wall Street multinational bank for \$13 billion.

With five million private investors on the online stockbroker's roll, the bank will gain access to not only the clients, but also the technology in which their clients prefer to trade. They will further consolidate the investment industry in a time when competition is fierce. Amidst the pressure of fintech and the rise of technology disruption across the investment management sector, changes in consumer behaviour are leading the way for banks to examine their current investment management models and find new ways of delivering the service consumers demand while ensuring returns both for the investors and for the banks.

Investments in sustainability and green funds are becoming increasingly popular among investors (Read more about this in Periculum's white paper "In It to Win It"). By providing such products, banks facilitate investments that have a positive environmental and social impact while simultaneously diversifying their client portfolio and maintaining pace with customers' changing behaviour.

Key Drivers to Future Credit and Liquidity Risk



Digital-only banks are becoming increasingly popular. During 2019 in the UK alone, there was a 165% increase for people with digital-only accounts.²¹ This increase results from a demand for faster and more instantly accessible applications providing real-time trading positions, the ability to easily switch investments between funds and so on.



Capital is moving from the public to the private market as companies look for different methods to maintain flexibility, including buybacks and more time spent private. Seven years ago, 25% of equity from new shares came from private markets, but that number has doubled to 48%.²²



Central bank interest rates are persistently near zero in an attempt by central banks to uphold economic performance. As a result, investment management companies are struggling to grow margins and free-up cash to invest in new models





(i.e. investment models, business models, etc.), ultimately affecting a large revenue source and hurting their liquidity profile.



As regulators continue to adapt their playbooks to changes in the investment management industry, new regulatory requirements are imposed. Implementing these requirements can be costly, yet unavoidable, threatening the future credit and liquidity positions of investment managers.

As younger generations increasingly adopt new technologies and demand access to fast investment options, investment management companies must move to adapt. But this requires capital to invest in infrastructure and major business model changes. Some of the risks to liquidity and credit that incumbent investment management companies may experience include:

01

Price war.

Investments are now easier for consumers to take on, and often come with incentives such as zero fees. The loss of fees is a risk for credit and liquidity as concerns about the earning power of companies intensifies during price wars. For example, one of the top three U.S. investment companies receives 46% of their revenues from fees. Cutting to zero presents a liquidity and credit risk in which almost half of their revenue is no longer reliable, consequently reducing flexibility and the ability to receive credit.²³

02

Reputational damage.

Being a major household name does not guarantee a share of market anymore, as buying power is beginning to skew towards millennials and Generation Z.^{24,25,26} Intergenerational changes are redefining values for companies they work with, and they expect companies to demonstrate social responsibility, ease of access, and more fair practices. They are vocal when a company experiences a disruption or fails to align their values to the public. For example, one major coffee company lost \$12 million dollars in one day when they shut down their companies nationwide for sensitivity training²⁷ due to #boycott. Reputational damage brought on by social media outcries led to financial losses, though, in this instance, it was a manageable liquidity impact.

03

Fintech competition.

Looking at the growth of fintech in the last decade gives rise to a new question: In 20 years' time, will their ability to fundamentally displace the investment industry become standard? The foundations of the system are changing, and how investment companies made money in the past is not how they will do it in the future. In general, there is less appetite for expensive fund managers with a shift towards machine learning and advanced analytics to identify trading opportunities, higher returns for clients and shareholders, and identifying new forms of investment risks. Financing this technology is costly, though, and may require companies to take on more debt, thereby presenting a liquidity risk.

04

High costs.

Investment management companies are being compelled to change due to operating at higher costs, updating legacy systems, and incentivising employees to maintain effective sales volumes. The higher costs it generates, the less likely a company is to repay on debt which translates to fewer, or more expensive, credit opportunities.



Exploring new models

As investment management companies take steps to mitigate the impact of these changes, many companies are exploring new business, operating, and trading models, such as:

- Assess current investments and trading models to identify how big data can be used to provide forward-looking predictions of investment performance. This will require identifying new correlations of consumer and market behaviours to detect potential changes in investment performance.
- Compete by engaging with passive or semi-active funds. Though these funds are not as lucrative for investment management companies because of lower fees, they are a good link to beginner investors and have potential to attract more retail clients, consequently contributing to higher revenue.
- Consider the potential benefits of partnering with a fintech company for access to their technical prowess. For example, Morgan Stanley's recent acquisition of E-Trade was driven by Morgan Stanley's CEO who saw there would always be a segment of consumers who prefer to trade digitally.²⁸ Investment management companies have the opportunity to transform competition into competitive advantage through partnerships.
- Explore whether current credit and liquidity forecasting models adequately incorporate stressed scenarios associated with investments linked to changing market and consumer behaviours. New forecasting models should be used for greater correlation between investment risk and potential credit and liquidity risks. Consider including enhanced data access and a centralised system that supports flexible data inputs and provides a consistent credit rating when implementing a new forecasting model. Through this, investment managers should run stress testing to better understand the consequences to credit rate and cross margin.
- Analyse patterns that relate to declining or rising investments to correlate those patterns with high or low risk. Consider methods to use this new pattern data to create a safety net for investors like spreading returns out over multiple years to give investors time to shift their investment portfolios into more profitable investments while maintaining liquidity through returns earned in "good" years.
- Use alternative data origins with intent to identify an economy's direction before competitors do. For example, investors concerned with how the coronavirus will affect profits have turned to alternative data to measure disruption, such as food delivery platform performance and using air pollution levels to determine industrial activity.²⁹

German Car Industry

Summary

Regulatory, reputational, and environmental pressures are accelerating a transition to electric vehicles in the auto industry. In 2017, the global sales for electric vehicles hit the 3 million mark³⁰, but just a year later, that number had grown to 5 million³¹. Further, autonomous vehicles are no longer a fascination of the future. Instead, they are widely being embraced by legacy automakers which requires significant investments, such as³²:

- A Japanese company investing \$2.8 billion to develop the technology for their vehicles
- An American company spending \$1 billion to acquire a self-driving tech startup
- A German company opening a 248,000 square-foot facility to develop self-driving vehicles

These transitions are costly as traditional manufacturing methods are replaced by modern technology presenting a threat to the liquidity of these companies in the interim.

Both the cost of transitions and the loss of employment for manufacturing employees has led to one of the biggest crises in the automobile industry history. In Germany, where the automobile industry has come to symbolise *Wirtschaftswunder*, their post-war economic miracle, this crisis is taking its toll. The German car industry supports nearly 3 million people in the economy, and it is expected the country will be forced to put €40 billion into the transformation.³³

In addition, two major German car makers were involved in scandals that resulted in fines and litigation that cost the companies investment money they had intended for electric-vehicle development. As a result of this scandal, one of the companies posted its first quarterly loss in 15 years³⁴ and received a \$2.8 billion fine, the largest criminal fine ever ordered for an automaker.³⁵ The other major company initially expected its 2019 earnings to be just over \$12 billion, but after the scandal, earnings estimates adjusted to over \$6 billion.³⁶

Key Drivers to Future Credit and Liquidity Risk



China has experienced a downturn in car sales for 17 consecutive months.³⁷ The German automobile industry has relied on Chinese sales for revenue – accounting for an average of around 40% of current sales.³⁸ Slowing global auto sales is a liquidity risk for automakers who need flexibility to move into electric technologies.



EU carbon emission rules are forcing the industry to speed up production of electric vehicles or face the prospect of hefty fines, but carmakers are not convinced demand for these vehicles will match the supply.³⁹



A change in manufacturing processes may lead to around 20 million job losses globally as production-style manufacturing gives way to increased automation.⁴⁰



Litigation and settlement costs for the emission scandals have impacted the available capital to invest in innovation, presenting a liquidity risk and potentially causing German car manufacturers to fall behind in new product development.



Ride-share and self-driving taxi services are disrupting the industry and decreasing sales of automobiles as newer generations seek ways to save money, be more environmentally responsible, and experience a wider array of transportation options.⁴¹



Concerns about air quality have led governments to charge fees for emissions in highly concentrated areas. For example, after only six months of the Ultra Low Emissions Zone (ULEZ) creation in early 2019, London saw a 4% reduction in carbon emissions and a 29% reduction in nitrogen dioxide emissions.⁴²



At a time when profits are declining, supplies are stagnating, and anxiety about the economic surety of the auto industry is high, raising capital for strategic investments could be problematic and come at a higher cost, higher risk. The pace of change combined with the multiple “drivers” of change in these sectors are leading to some increasingly significant risks that, compounded, could be detrimental to the future credit and liquidity risk profile of market participants. Examples of those risks follow.

01

Concentrated supply chains.

Companies whose concentrated supply chain gets hit by disruptive events, such as natural disasters, will not be able to move fast enough to save their revenue resulting in liquidity risks from production loss. Consequently, companies with disrupted and limited suppliers could suffer a credit risk when they struggle to pay their loans, culminating in affecting the company’s ability to invest in R&D initiatives and other automotive innovations later.

02

Electric vehicles.

The rise of electric vehicles can be traced to current consumer trends and increased regulations on emissions. Moving to vehicles that fill these new demands is costly for traditional automobile companies. With situations like Dieselgate, where major German carmakers cheated emissions tests⁴³, and fourth quarter losses resulted for a major German carmaker due in part to not moving into the electric or hybrid segment⁴⁴, it is clear that not committing to change is a strategic risk that could lead to liquidity issues.

03

Secondhand market and ride share.

The automotive industry is already challenged by its secondhand market, but there is a deflation in the ability of automakers to turn inventory of pre-owned vehicles. Additionally, consumer behaviours are shifting to shared vehicles and ride sharing which may have a significant impact on legacy automakers’ ability to achieve a satisfactory level of sales and get cash for investments. Technology such as Carvana, the pre-owned car “vending machine”, has made it easier and quicker to find secondhand cars, but younger generations are eschewing any kind of car ownership. New registrations for 18- to 34-year-olds dropped from 24 to 13 percent since 2001.⁴⁵ This liquidity risk is leading to secondhand car inventory becoming an increasingly illiquid asset.

04

Decreasing investor confidence.

Across the automobile industry and the economy, there is decreased investor confidence. This means companies may struggle to raise sufficient capital for innovation, so they will need to go back into the market to ask shareholders for more capital. On the back of a declining legacy book and stress cash flows, the shareholders may not be there to help. As a result, manufacturers will be forced to go to lenders who will charge higher rates for their capital. This will affect the manufacturers’ credit risk.

05

The leasing industry.

Legacy automakers may be left with huge write-downs and even write-offs of models they can’t shift. If the market accelerates its decline at the same time as consumers move to hybrids or electric, companies will be left with the older new cars. Large amounts of write-downs or write-offs of end-of-lease vehicles that can’t be shifted could be financially harmful. Automakers will be left with increased amount of new inventory that they struggle to sell. The assets will become less liquid and the time to sell will increase, thereby presenting a liquidity risk in case of financial distress.

06

Cost of regulation.

To meet regulatory changes, companies must invest in ensuring emission targets. The cost of regulation is not simply meet it or pay fines, though. In some cases, in order to meet standards, an entire redesign of the makes and models of the inventory will be needed – this includes designing, obtaining supplies for, and manufacturing hybrid, electric, and self-driving vehicles. This threatens both liquidity and credit as costly redesigns and inventory that does not meet regulations may result in less revenue.



Exploring new models

- Incorporate extreme but plausible scenarios for a full transition to hybrid and electric-based vehicles by 2050 into forecasting models and stress testing. Stress test the balance sheet to finance that transition, but also stress test liquidity to verify that with the increased cost of operations, the company maintains the flexibility to adapt to changing markets during this long capital-intensive transition period.
- Anticipate potential regulations by pushing beyond the targets in compliance models, potentially saving capital expenditures in the future when new targets are released, and new research and development is required.
- Use models to identify points of high risk within the company's operations and diversify the supply chain accordingly. The number of billion-dollar natural disasters is increasing. In 1980, there was an average of 2.7 per year in the U.S., but since 2010, that number has climbed to 10.5.⁴⁶ Mitigating operational single points of failure by increasing operational resilience will reduce exposure to catastrophic events that result in unplanned recovery costs and new product delays. Stress test cash flow against the impact of several severe scenarios, for example, if there was a swift and significant acceleration driven by new market entrants.
- Address the decoupling of concentration risks in the supply chain to mitigate liquidity risks associated with the sudden failure of a critical supplier.



Airline Industry

Summary

Upstart airline companies have grown quickly as the number of passengers have risen (in 2018, by 6.4%⁴⁷) alongside budget-conscious mindsets. This demand has led to discount airlines taking on large amounts of debt, sometimes choosing debt over profitability. But 2018 was a year when many international discount airlines struggled with some closing their doors or pursuing new talent and business strategies, such as a Norwegian airline's new CEO who announced a significant strategic shift to avoid the company falling into financial failure.⁴⁸

That airline saw rapid growth over 15 years⁴⁹, and the amount of money they borrowed to make it happen caused heavy financial pressure. After a 75 percent drop in share price, the company announced a new chief executive, switching their strategy to prioritise profitability over passenger growth along with adding new routes. But for many other economic airlines, the situation was more dire, such as with a Danish airline who suddenly collapsed in 2018 after difficulty with, in part, high costs associated with aircraft leases, operational problems, and failures at finding financing.⁵⁰

The airline industry has been forced to take long-term bets, such as purchasing aircraft or securing new routes, which cannot be strategically reversed quickly, often becoming a drain on liquidity when economic conditions decline. This is particularly a concern in the

current economy where shifting consumer attitudes, competition from discount and prestige airlines, and geopolitical risks proliferate. In the last three years, seven airlines have folded, including the largest airline in the UK to ever fail and one that had been flying since the late 80s, but whose history went back nearly two centuries in other sectors of the travel industry.⁵¹

Airlines will need to navigate a volatile economic environment while having cash on hand and prioritising profitability over unsustainable growth supported by debt. Several risks exist in the airline industry that historical models fail to account for and could result in many airline companies experiencing financial difficulty. Some of these risks include:

01

New economic realities.

For several years, airlines have been building capacity, but in a slowing or declining economy, which can lead to oversupply of seats. Airlines, while making long-term bets based on current or previous trends, should assess how changes in economic cycles will impact their future credit and liquidity profile. They should ensure they have rollback plans incorporated into strategic decisions that provide adaptability without losing ability to maneuver towards future sustainability.

02

Increasing pressure for carbon-free flying.

Narrative economics has influenced regulatory decisions and corporate social responsibility for greener practices. Pressure has been heavily placed on airlines to find ways to reduce their carbon footprint and engage in cleaner energy or offset their carbon emissions. Despite the industry being one of the most difficult to decarbonize, several airlines have pledged to offset carbon emissions entirely by 2050. However, this solution has been called "greenwashing" with opponents saying that paying for carbon offsets so the airlines can continue polluting is not a true solution. Creating technology for carbon-free flying will require significant investment of money and time (and may not be a possibility), which means greater liquidity risk for companies hoping to retain flexibility to compete.⁵⁴

Key drivers to future credit and liquidity risk



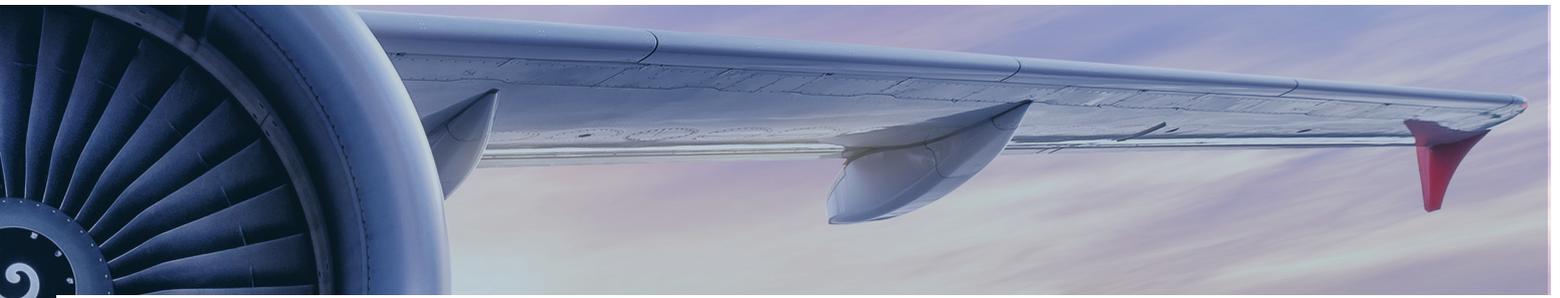
Jet fuel costs that rose in 2018 and that remain volatile in 2020⁵²



Legacy operators launching new low-cost flight options⁵³



Expansion into new routes forcing more competition and logistical and strategic risks.



03

High competition in the sector.

Legacy airlines are experiencing extensive competition from new airlines, both in the form of discount airlines who offer deals for thrifty travellers and prestige airlines from the Middle East. The low-cost competitors are no frills – they simply want to disrupt prices. One example of this is an Irish discount airline started in 1985. In 2019, this cheap travel option flew 142 million passengers, nearly double the amount they flew in 2011/2012.⁵⁵

This competition often focuses on one strategy and, through that, pulls passenger share from legacy airlines. As competition increases, legacy airlines are pulled into liquidity risks following fewer customers resulting in lower income as “empty” flights are still flown for lower returns or may be potentially loss-making. Consequently, this may affect their credit position since lenders might increase their rates for airlines on borrowed capital to offset the risks faced when lending capital.

04

External risks.

The airline industry is often subject to outside external shocks that impact consumer’s financial ability and desire to travel including downed planes, pandemics, like the coronavirus, and other events that are not always in the company’s control. For example, one major airline experienced a drastic drop in stock price, and was even removed from the stock market, after its plane went down and another was shot down.^{56,57} The recent coronavirus outbreak is set to cost airlines \$29 billion as two-thirds of Chinese passenger planes have been grounded.⁵⁸ These uncontrollable threats put both liquidity and credit at risk due to decreasing revenue and concerned lenders.

05

Dependence of suppliers.

The aircraft supply chain is mostly duopolistic. Two aircraft manufacturing giants hold 88% of market share.⁵⁹ This dependence is concerning, especially when one or both of them have trouble delivering flyable aircraft such as the grounding of a major aircraft manufacturer’s jetliner costing the company \$10 billion, with expectations for loss closer to \$20 billion.⁶⁰ In situations where new aircraft are not available to replace legacy aircraft or supplement increasing consumer demands, airlines face credit risk from slower revenue that could lead to defaulting on debt.

Exploring new models

- Evaluate the business strategy against changing consumer and company behaviours, combined with the concentration of routes from high geopolitical risk nations. Assess the ability of the company to continue to invest in the business plan against severe but plausible changes in economic and/or geopolitical conditions. Consider how these scenarios will affect the credit grade of the company and what actions to take to maintain a good credit grade.
- Retain financial flexibility by obtaining capital in alternative ways to taking on more debt, such as:
 - Issuing stocks (this could lead to a decrease in power within the company)
 - Participating in joint ventures (Short-term profits will be shared, but companies will not be dependent on creditors who can complicate things. In the long term, companies will have built up capital to invest in strategic moves.)
- Understand what it means to maintain credit grade in a downturn, how to prepare for it, and what proactive steps to take to improve credit grade. Then weigh these risks against the strategic business plan. Determine at what point during a shifting market to adjust the strategic plan in order to maintain credit grade and investment flow. Integrate liquidity and credit objectives into the plan and find scenarios that may prevent plan completion.
- Embed rollback plans into strategic decisions that link the ability to scale back capital-intensive investments linked to external scenarios that may alter the company’s credit and liquidity risk profile.
- Assess the aggregated impact of changes in external risks to the company’s business plan and investment portfolio. Identify what to stop or continue in the case of changes in credit and liquidity risk profile prompting protective measures that align the company’s actions to the materialisation of risk.

CONCLUSION

The creation of new markets and the disruptions that exist in many existing industries have led to an incredible enrichment of data that needs captured and used to construct models for forecasting liquidity and credit risks.

Underlying this is the ability to detect new patterns effectively which is supported by a greater understanding of the key risks and how these risks will lead to change in the industry.

Markets will not stop changing. The pace of disruption is expected to increase in some industries as new standards become the norm (i.e. such as the transition to autonomous vehicles in the auto industry). Risks of new entrants, movements of manufacturing, and advancing technologies mean current and future models should be analysed thoroughly. Then, the models must detect new patterns – strategic, investment, operational, and geopolitical risks, amongst others – and recognise the interconnectedness of these risks to the future credit and liquidity risk profile of the company. One way to do this is through big data and machine learning that creates new views of the way in which economic changes will put stress on credit and liquidity.

Additionally, companies will need a view of critical entities within the ecosystem, both on the demand and on the supply side, and how these entities are also exposed to some of these pressures. From this, companies can determine where there is a higher probability of default and have in place the correct contingencies to mitigate the risk to their aggregated profile.

As the 4th Industrial Revolution rolls full steam ahead, changing history in the same way Henry Ford's assembly line did, companies are yet again tasked with the responsibility of predicting future credit and liquidity risk profiles against a vastly dynamic set of factors that are altering the fundamentals of economics. To do this, companies must seek to understand new markets through the lens of new models.



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