

# LINEAR RISKS

# PREFACE

Society and businesses are becoming increasingly aware that the resources needed for products are not infinite. There is growing pressure on the availability of resources due to a variety of factors including the expected increase in global consumption of goods spurred by a growing global middle class. Unfortunately, current economic practices that follow a 'take-make-waste' approach - what we term the 'linear economy' - do not focus on preserving the value of resources and more effectively utilising them in order to relieve this pressure. As a result, there are a variety of business risks that arise from adhering to a linear economy mindset. These risks stem from future resource shortages and associated impacts on prices, supply continuity and market dynamics if we continue to follow a business-as-usual approach.

**This essay aims to introduce the various business risks of common 'linear economy' business practices and start a dialogue with the financial and business community about their implications.** Building on this essay, we wish to explore further directions to better understand and model them. We hope that these risks will one day become an integral part of investment decisions to ensure better investment decisions that achieve long-term stability and growth.

The essay has been developed through the FinanCE working group: a collection of commercial banks, international financial institutions, actuary firms, small and institutional investors and NGOs<sup>1</sup>. The group's mission is to identify how finance can facilitate a transition to a more circular economy and address the financial barriers such a transition faces. The group realises that a circular economy requires a fundamental shift in business and consumption practices across value chains in terms of product design, smarter resource management and consumer habits. A shift to a circular economy will also change corporate risks, cash flows and customer relations for businesses. The financial sector will need to adapt to these changes to be able to offer the products and services businesses will need. While this transition has many facets and stakeholders, understanding and articulating the risks of linear economic practices is an important step to compare the opportunities presented by a circular economy to traditional, linear economy models.

1. Circle Economy, PGGM, KPMG, EBRD, ABN AMRO bank, Rabobank, ING Bank, Intesa SanPaolo, European Investment Bank, Circularity Capital, Sitra, CDC, Sustainable Finance Lab, and Danish Business Authority



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# 1

## INTRODUCTION

Managing risk is a core part of the investment process for financiers, and a key factor to their stability and long-term growth. However, companies that continue to operate in a linear economic *'take-make-waste'* approach and the financial institutions that invest in these businesses are exposed to a variety of risks that are mostly overlooked and are missing in traditional risk evaluation approaches.

**We will refer to these missing risk factors as 'Linear Risks', the exposure to the effects of linear economic business practices - utilise scarce and non-renewable resources; prioritise sales of virgin products; fail to collaborate; and fail to innovate or adapt - which will negatively impact an organisation's ability to continue as a going concern.**

If unresolved, these risks could have a substantial effect on the financial industry and the global economy in the future through unanticipated losses.

This essay seeks to highlight the risks of linear economic business models and enable the financial and business community to recognise them and account for them in their investment decisions. The 'Linear Risks' Matrix in this paper presents an initial guiding framework for investors to identify their portfolio's exposure to the effects of linear economic business practices and for businesses to understand such risks in their operations.

We welcome interested parties in the financial and business community to join us in further research to refine the concept of 'Linear Risks' and the 'Linear Risks' Matrix framework. Subsequent research can enable the development of risk assessment tools and scenario-based models that not only try to quantify 'Linear Risks', but also identify the mitigation impacts of circular economy strategies.



# 2

## INTERNALISATION OF EXTERNALITIES

Traditionally, externalities have been largely excluded from company's risk profiles and the measurements of corporate value or income statements. This means that investors and companies have not been fully rewarded for the positive environmental or societal impacts they created through externalities, like creating jobs, using proven net-positive circular products or providing education and healthcare to workers or communities. Conversely, investors and companies have also not been penalised for negative societal impacts, like generating or incinerating waste, depletion of scarce resources, noise and air pollution, or degrading ecosystems.

There is a growing trend of companies internalising externalities<sup>2,3</sup>. This means that risks such as economic, social and environmental impacts and opportunities are added to traditional financial decision making. There are multiple factors that can drive this internalisation from market dynamics to external policy pressures (detailed further below), with the common

theme being companies' desire to achieve operational stability in their respective markets.

The drivers of internalisation of externalities can consist of:

- **Regulations and standards:** there is increasing government legislation and industry standards to change corporate behaviour, such as the European Commission Circular Economy Package<sup>4</sup>, as well as the Task Force on Climate-related Financial Disclosures<sup>5</sup>. Such initiatives provide various regulatory mechanisms and market incentives to help increase companies' awareness of their impacts and factor this understanding into their business or investment decisions.
- **Stakeholder actions:** awareness of corporate impacts on society is growing among stakeholders – such as investors, shareholders, NGOs, consumers, communities and workers. As a result, there

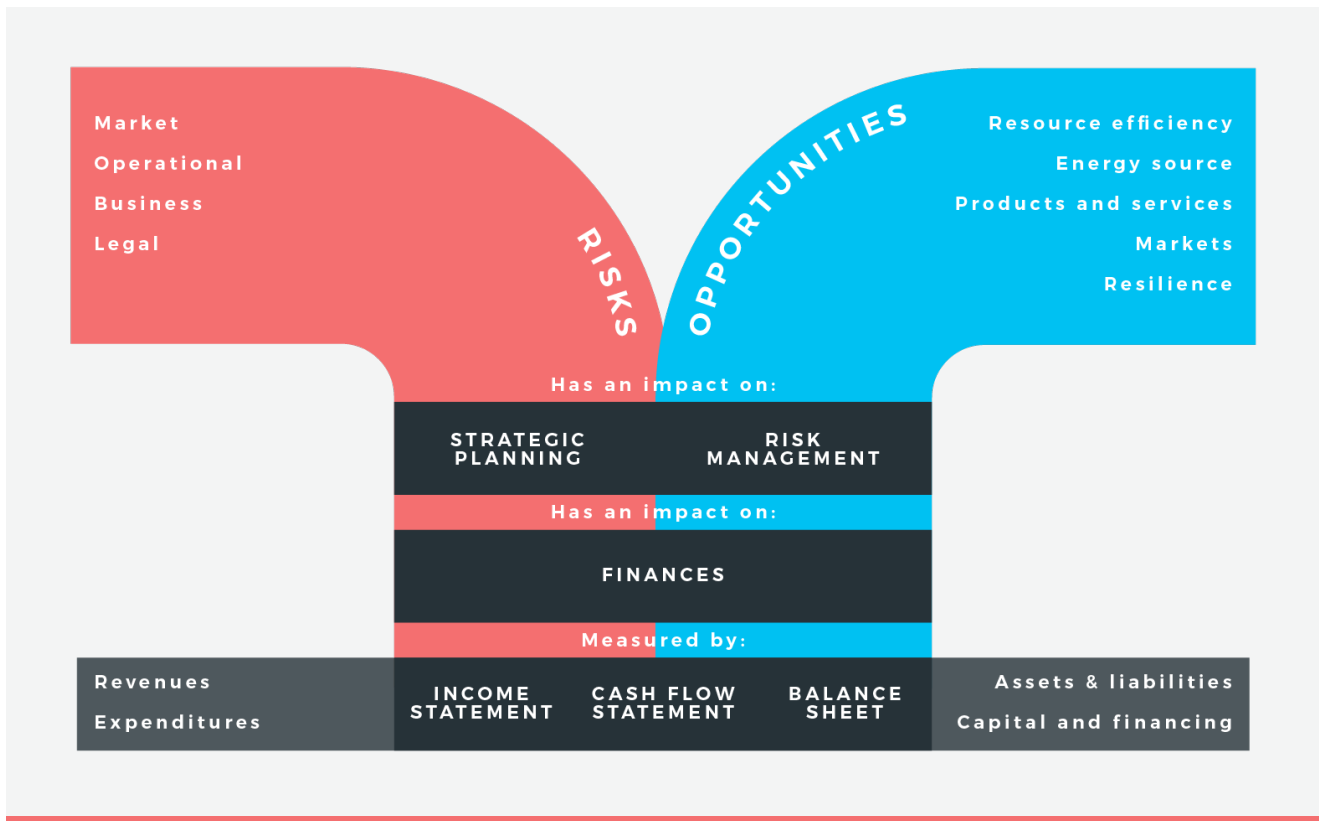


Figure 1. Risk management model adapted from KPMG<sup>6,7</sup>

2. KPMG (2014); A New Vision of Value: Connecting corporate and societal value creation. <https://assets.kpmg.com/content/dam/kpmg/pdf/2014/10/a-new-vision-of-value-v1.pdf>

3. Statement of support from 100 corporations for the Task Force on Climate-related Financial Disclosures (TCFD) established through the G20's Financial Stability Board (FSB); <https://www.fsb-tcfd.org/statement-supporting-companies-june-2017/>

4. [http://ec.europa.eu/environment/circular-economy/index\\_en.htm](http://ec.europa.eu/environment/circular-economy/index_en.htm)

5. <https://www.fsb-tcfd.org/>

is growing pressure on companies to improve environmental policies. Such stakeholder activism can impact company's brand or product value, as well as affect the availability of future business opportunities.

- **Market dynamics:** changing operating environments, resource scarcity, and the rise and fall of new markets and technologies are disrupting historical patterns of supply and demand. As price volatility of scarce commodities rises and impacts company profitability, businesses are increasingly taking these impacts into consideration in their decision making and forecasting<sup>6,7</sup>.

These drivers of internalisation have existed before but we can see today a rapid acceleration and intensification, requiring investors to consider such externalities in their risk and opportunity assessment.

The capacity and expertise to recognise externalities, particularly for environmental and social concerns, and appropriately incorporate them into financial evaluations is growing. Figure 1 shows<sup>8</sup> KPMG's methodology for linking externalities to financial impacts. This model feeds into KPMG's True Value Methodology<sup>9</sup>, which monetises the environmental and socioeconomic impacts of an organisation and/or its products and services and quantifies them in financial terms.



6. <https://www.sap.com/documents/2016/12/eec54835-9c7c-82c7-eda71af511fa.html>  
7. [https://www.wri.org/sites/default/files/Revaluimg\\_Ecosystems\\_April\\_2015\\_2.pdf](https://www.wri.org/sites/default/files/Revaluimg_Ecosystems_April_2015_2.pdf)  
8. KPMG (2012): Expect the Unexpected. Building business value in a changing world. <https://home.kpmg.com/content/dam/kpmg/pdf/2012/08/building-business-value-part-1.pdf>  
9. <https://home.kpmg.com/content/dam/kpmg/pdf/2015/06/holcim-ambuja.pdf>

# 3

## DEFINING 'LINEAR RISKS'

The current economy largely relies on business practices that stem from the Industrial Revolution. Ever since that period, economic development has followed the assumption that there will be a constant, economically viable supply of natural resources. This has resulted in a linear economic approach based on the extraction of resources, production of goods and services, and disposal of waste after end of use - a 'take, make, waste' mentality.

### LINEAR BUSINESS PRACTICES

Companies that operate with a linear economic approach have a particular set of business practices. These companies tend to:

- **Utilise non-renewable resources** - the company supplies or relies on primary resources that will become scarce or non-renewable for its operations
- **Prioritise sales of new products** - the company designs for short, single product ownership lifetimes that results in landfilling, incineration and export of waste products
- **Fail to collaborate** - the company maintains strict control over knowledge and does not engage in partnerships or collaborative projects
- **Fail to innovate or adapt** - the company maintains their perspective on the market, and does not innovate or adapt to evolving market conditions

However, the linear economic approach is increasingly coming under pressure. Non-renewable resources previously thought inexhaustible are reaching the limits of affordable supply. And the negative environmental impacts of resource consumption, such as climate change and biodiversity loss, are accelerating and are being regulated at local, national, and international levels.

In addition, new technological disruptions, and emerging markets and business models are changing the way we think about the production and consumption of goods and services. Linear economic business models are dependent on short product life cycles and maximisation of sales. These models are

being threatened by technology-based service models and changing consumer demand for more tailored and sustainable products<sup>10</sup>.

As a result, companies that continue to operate in the old linear paradigm of the Industrial Revolution are at risk of losing clients and access to markets, increased costs, etc. And the financial institutions that have invested in these linear economic businesses could face unanticipated losses.

Although risk management covers various types of risk, 'Linear Risks', the exposure to the effects of linear economic business practices - utilise scarce and non-renewable resources; prioritise sales of virgin products; fail to collaborate; and fail to innovate or adapt - which will negatively impact an organisation's ability to continue as a going concern, is often overlooked.

### LINEAR RISK



The exposure to the effects of linear business practices - utilise scarce and non-renewable resources; prioritise sales of new products; fail to collaborate; and fail to innovate or adapt - which will negatively impact an organisation's ability to continue as a going concern.

Current risk assessments and disclosures do not comprehensively account for 'Linear Risks', and as a result financial portfolios are loaded with investments that are exposed to these risk factors without being properly considered in the risk assessment process. Some companies are acutely aware of the impact that volatility in resource supplies and prices would have on their business, particularly in resource intense industries such as steel and automotive manufacturing; however, such awareness is not pervasive. As investment in manufacturing and resource consumptive industries will continue, it's critical for companies to properly evaluate 'Linear Risks', accounting for them in decisions and compensating investors for being exposed to them.

In the near future, 'Linear Risks' will no longer be a theoretical condition or a doomed forecast. And the financial and business community have a huge opportunity to start to mitigate these risks now by becoming more aware of them, taking them into account in investment and business decisions, and considering circular businesses for their portfolio.

10. [https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation\\_Intelligent\\_Assets\\_080216.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/publications/EllenMacArthurFoundation_Intelligent_Assets_080216.pdf)

## RISKS FACTORS

'Linear Risks' account for developments and trends such as future volatility in resource supply and price, failures in the value chain, and disruptive new business models. To identify 'Linear Risks', we use a typology of four risk factors - market, operational, business, and legal risks - adapted from the Open Risk Manual<sup>11</sup>.

- 1. Market** - market risks involve market and trade-related factors that impact business' assets and liabilities, such as price volatility, resource scarcity, trade bans, higher interest rates, lower investor interest, etc.
- 2. Operational** - operational risks involve factors that threaten the internal operations of a firm, such as supply chain failures, internal process failures, worker safety issues, difficulty hiring or retaining talent, etc.
- 3. Business** - business risks are a result of emerging societal, economic and political trends that threaten the firm's strategic business plan objectives, such as changing consumer demands, new technologies, new business models, etc.
- 4. Legal** - legal risk arises from the failure to comply with current as well as future regulations, standards or protocols, such as sourcing rules, new government policies, extended producer responsibility, and fines or lawsuits.

By combining the linear economic business practices and the four risk factors, we get a full picture of the 'Linear Risks' that companies are exposed to if they follow linear economic business practices. Various examples of cases where 'Linear Risks' have impacted businesses are presented and can be reviewed in greater detail by clicking on the links.

**It is important to note that we are considering linear economic business practices and risk factors in the large sense, beyond simply resources. It is true that some of these situations and risks can also take place in companies that follow circular economy practices. However, more circular companies would have actions in place to avoid and mitigate these risks, and as a result be less likely to face 'Linear Risks'.**

11. Adapted from the Open Risk Manual: [https://www.openrisk.eu/WhitePapers/OpenRiskWP04\\_061415.pdf](https://www.openrisk.eu/WhitePapers/OpenRiskWP04_061415.pdf) and FinanCE report <http://www.circle-economy.com/moneymakestheworldground>





## LINEAR RISKS MATRIX

Click on the examples below to read more

Linear business practices:

		Utilise non-renewable resources	Prioritise sales of new products	Fail to collaborate	Fail to innovate or adapt
Risk factors:	Market	<b>Scarcity of primary resources</b> Example - world's cobalt supply scarcity  <b>Volatility of resource prices</b> Example - nickel price volatility	<b>Bans on trade of waste</b> Example - U.S. impacted by China waste ban  <b>Volatility of resource prices</b> Example - cotton price volatility impacts mills	<b>Limited opportunities to expand to new markets</b> Example - pharmaceuticals battle IP rules in India	<b>Scarcity of resources</b> Example - shortage of waste for incinerators  <b>Volatility of resource prices</b> Example - construction materials/ equipment price volatility
	Operational	<b>Internal process failures</b> Example - toxic jewelry removed from stores	<b>Worker safety issues</b> Example - worker safety issues in fast fashion supply chain	<b>Supply chain inefficiencies</b> Example - lack of common supplier requirements hurting construction industry	<b>Inability to hire new talent</b> Example - manufacturing industry facing challenge finding interested workers
	Business	<b>Changing demand for sustainable solutions</b> Example - greater pressure for greener cleaners  <b>Decreasing cost of renewables</b> Example - utility energy pricing impacts due to renewables	<b>Disruptive new business models</b> Example - car sharing models impact sales  <b>Decreasing margins from commoditisation</b> Example - commoditisation of Dell's PC business	<b>Disruptive new technologies</b> Example - television industry impacted by online media	<b>Disruptive new technologies</b> Example - taxi industry impacted by new apps  <b>Disruptive new business models</b> Example - retailers shut down due to the Amazon factor
	Legal	<b>Fines for legal violations</b> Example - Thai coal mining subsidiary fined for dumping hazardous waste  <b>More stringent environmental laws</b> Example - sharp increase in climate change legislation since COP21	<b>Requirements for extended producer responsibility</b> Example - France pushes for 'lifetime' labelling	<b>Fines for legal violations</b> Example - Qualcomm sued for anti-competitive practices	<b>More stringent environmental laws</b> Example - chemical industry at risk of regulatory backlash similar to diesel industry

The 'Linear Risks' Matrix outlined above proposes a guiding framework to help investors and companies identify and understand 'Linear Risks'. Investors can use the matrix to identify the companies in their portfolio that follow linear economic business practices and how exposed they are to 'Linear Risks'. Similarly, businesses can also use the matrix to identify which aspects of their operations follow linear practices and as a result, what types of market, operational, business, legal, and reputational risk factors they should be aware of.

While a useful framework, the matrix is merely meant to provide an initial understanding of 'Linear Risks'. The full impact of 'Linear Risks' is dependent on a complex analysis of the company's linear economic business model, and can be very different per company even when they are in the same sector and market. For

example, a company primarily using critical resources due to a lack of an effective alternative will face a different level of 'Linear Risk' compared to a company primarily using critical resources for cost reasons. In addition, the various risks mentioned are not isolated and also interact with each other. For example, if there is increased risk of resource scarcity, there is a higher chance of more stringent laws and regulations regard the use of that particular resource. More research is required to develop the right metrics to quantify and measure 'Linear Risks' in greater detail, to see how 'Linear Risks' exposure differs across industries, and to provide solutions to mitigate 'Linear Risks'. Ultimately, a shift to more circular economy practices is needed to effectively mitigate 'Linear Risks'.

## RISKS OF LINEAR THINKING IN CAR MANUFACTURING

The automotive sector is undergoing two transformations. The first is technology, as internal combustion engine vehicles are being replaced with electric vehicles<sup>12</sup>. And the second is ownership, as vehicle ownership is moving towards shared models<sup>13</sup>. These two trends will significantly impact the industry and cause a revolution in car manufacturing. Considering these future developments, the current automotive industry faces 'Linear Risks', three examples of such risks are highlighted below:

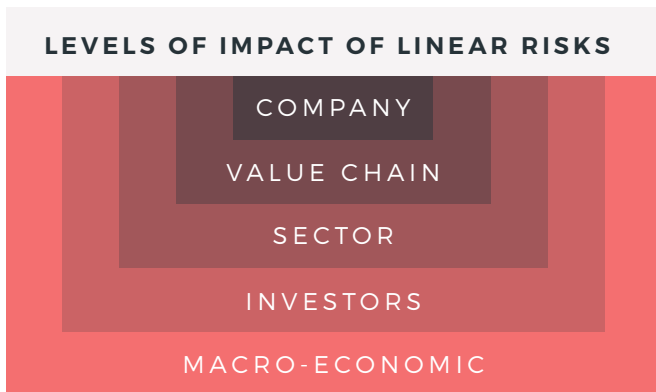
- 1. More stringent environmental regulations: Increasing emissions reduction regulations and bans on internal combustion engines drive adoption of electric vehicles** With the signing of the Paris Agreement and greater focus on CO<sub>2</sub> reduction, there are accelerating efforts to enforce stricter emissions standards for vehicles, with plans to reduce emissions by 25-30% by 2030<sup>14</sup>. In addition, regulators are increasingly pushing for greater production of electric vehicles, with some countries planning to ban sales of vehicles running on fossil fuels. This presents a risk to automakers who are not prepared to make the shift to low-emission vehicles in the short-term and electric vehicles in the long-term.
- 2. Disruptive new technologies: Electric cars require different production methods and supply chains** Electrification means that the engines and the construction of cars will become a lot different. An eight-cylinder engine consists of around 1200 parts, whereas an electric engine is only composed of about 20 parts. This has significant implications on the supply chain, as suppliers of certain parts such as pistons or crankshafts will not be required anymore. Car manufacturers who have gained expertise in producing combustion engines and cars over decades will have to adapt quickly and develop similar expertise in battery production. Companies that do not adapt to these advances will be left behind.
- 3. Disruptive new business models: Last mile logistics stretching into the traditional mobility market** While last mile logistics and personal vehicles are traditionally discussed separately, disruptive new technologies and business models are quickly merging these two topics. Vehicles typically focused on mobility are being adapted for last mile logistics, fuelled by entrepreneurs, new technologies and lack of regulations<sup>17</sup>. As this trend continues, the line between mobility and logistics begins to blur, presenting a potential risk for the traditional automotive sector.



12. <https://cleantechnica.com/2017/02/04/tesla-model-s-clocked-as-worlds-best-selling-electric-car-in-2016>  
13. [http://innovativemobility.org/wp-content/uploads/2016/02/Innovative-Mobility-Industry-Outlook\\_World-2016-Final.pdf](http://innovativemobility.org/wp-content/uploads/2016/02/Innovative-Mobility-Industry-Outlook_World-2016-Final.pdf)  
14. <https://cleantechnica.com/2017/10/31/7-eu-countries-call-european-commission-set-strict-co2-vehicle-emissions-standards>  
15. <https://www.nbcnews.com/business/autos/these-countries-want-ban-all-vehicles-run-gas-or-diesel-n781431>  
16. <https://www.allthingsupplychain.com/the-impact-of-electric-vehicles-on-automotive-logistics>  
17. <https://www.supplychaindive.com/news/last-mile-spotlight-trends-tech-gig-perfect/443091>

# 4

## WIDER IMPACTS OF 'LINEAR RISKS'



We discussed in the previous paragraphs the concept of 'Linear Risks' from the perspective of an individual business. However, these risks have systemic impacts.

There are multiple direct and indirect impacts linked to 'Linear Risks' across other levels in the economy, as shown in the figure above. The following four levels are relevant when we consider the wider impacts of 'Linear Risks':

**1. THE VALUE CHAIN** When a company is unable to adapt to changing dynamics, it has implications for the organisation upstream and downstream in the value chain. If a particular actor within the value chain is highly exposed to 'Linear Risks' and becomes a weak link within the chain, the whole chain bears the consequences. For example, when Borders bookstores were shut down because they were unable to adapt their business model, many publishers were affected<sup>18</sup>.

**2. THE SECTOR** Companies are not the only entities who face 'Linear Risks'. Entire industries and sectors can also be affected by these risks. For example, the video rental and video store industry's failure to adapt to new streaming technologies and new business models led to a significant decline in the industry. In Australia, the industry went from a high-point of \$1.5 billion in 2004-05, to nearly one-third of that in 2015, with an annualised decrease of 21 percent expected through 2019<sup>19</sup>.

**3. THE INVESTORS** As mentioned earlier, financial portfolios are currently loaded with investments that are exposed to 'Linear Risks' factors. Equities, fixed income and commodities all inherit their own form of 'Linear Risks'. Investors could see their risk return ratio worsen when these risks materialise and lead to negative outcomes. For example, China's rapid transition to renewable energy has resulted in huge losses in the Chinese coal power sector and left nearly \$90 billion in stranded coal infrastructure that will never make a return on investment<sup>20</sup>.

18. <http://www.telegraph.co.uk/culture/books/10043774/US-publishers-still-reeling-from-Borders-bankruptcy.html>

19. <https://www.smh.com.au/entertainment/technology-killed-the-video-store-20150506-1mrikr.html>

20. <https://www.ft.com/content/86db7612-c822-11e7-ab18-7a9fb7d6163e>



**4. THE MACRO-ECONOMIC** 'Linear Risks' within businesses, sectors, and financiers can ripple across the broader economy, leading to macroeconomic impacts. This not only leads to economical costs but also to societal costs, like unemployment and negative impact on GDP.

'Linear Risks' also have varying impacts over different time scales. Although some 'Linear Risks' may seem long-term, they may present themselves sooner than anticipated due to shifts in industry trends, socioeconomic conditions or regulations. For example, the global surge in electric car demand quadrupled the price of Cobalt in only two years<sup>21</sup>. The seemingly overnight imposition of the China waste<sup>22</sup> ban also highlights how perceived risk time horizons related to our current economic model can accelerate rapidly.

These time-related impacts of 'Linear Risks' are of particular importance for investors. Depending on the asset class and time horizon that an investor takes, they may find that some forms of 'Linear Risks' are more material than others. Whereas traders and short-term investors are more concerned with asset (i.e. commodity) price volatility, long-term investors try to mitigate the risk of their portfolio.

These multiple levels of impact both in terms of levels of the economy and over time highlight how 'Linear Risks' are not merely an individual business problem, but a wider societal problem. Therefore, the involvement of multiple stakeholders is required to increase business resilience and fully counter 'Linear Risks'. Multiple stakeholders are required to increase business resilience and fully counter 'Linear Risks'.

## **CIRCULAR ECONOMY AS A POTENTIAL SOLUTION TO 'LINEAR RISKS'**

The opportunities within the circular economy can provide a solution to mitigate 'Linear Risks'. The circular economy is an emerging economic concept that provides new business models and strategies to continuously reuse materials and resources to their fullest potential. At the heart of the circular economy is the idea of moving away from linear economic business practices and directly challenging the 'take, make, waste' mentality, aiming to achieve social well-being while operating within the boundaries of our planet.

A 2017 WBCSD publication<sup>23</sup> found that 80% of companies surveyed cited accelerating growth or enhancing competitiveness as the primary driver for circular strategies. Only 20% recognised risk mitigation as a value driver for moving towards a more circular model.

By employing circular economy strategies, companies can mitigate many of the risks outlined in the 'Linear Risks' Matrix. Companies that employ circular economy strategies reduce their dependency on scarce natural resources and hedge against future price volatility. Circular companies utilise innovative production techniques and business models that reduce supply chain inefficiencies and increase their competitive advantage. Since circular companies prioritise their environmental and social impact, they are better prepared for future changes in environmental regulations as well as reputational risks from negative perception.

The concept of the circular economy is at the forefront of sustainable development thinking and has gained widespread recognition at local, national, and international levels. As a result, more and more companies are transitioning towards circular economy practices to future-proof their business and minimise their risks.

21. <https://www.ft.com/content/1e6303f6-2386-11e8-add1-0e8958b189ea>

22. <https://www.bna.com/us-recycling-woes-n57982089254>

23. <http://www.wbcscd.org/Clusters/Circular-Economy/Resources/8-Business-Cases-to-the-Circular-Economy>

# 5

## LOOKING AHEAD

This essay proposed an initial definition and framework to help investors and businesses better understand 'Linear Risk', the exposure to the effects of linear economic business practices, which will negatively impact an organisation's ability to continue as a going concern.

'Linear Risks' appear along the entire product life cycle and impact people from all company departments. Extending well beyond the purview of solely the risk department, the 'Linear Risks' affect those in product design, marketing, global affairs, procurement, production, supply chain, finance, legal and human resources, among others.

The future ambition is to extend the definition of 'Linear Risks' and the 'Linear Risks' Matrix through subsequent research. Steps need to be taken to develop specific metrics to more concretely quantify 'Linear Risks' and incorporate tools such as the True Value methodology to put a monetary value to 'Linear Risks' and make it easier for investors to account for them in their analysis. These metrics can be used to create stress tests, explore shadow pricing, and develop NPV calculations with 'Linear Risk' as a factor.

To effectively address 'Linear Risks' companies could evaluate business resilience by understanding the risk impact versus vulnerability, not risk impact versus likelihood. This exercise should identify business continuity risks at both the asset and company level.

Through these tools and models, we intend 'Linear Risks' to become an integral part of decisions in the financial and business community, so that such risks are more comprehensively accounted to ensure long-term stability and growth.

Investors and business should not dismiss linear risks as long-term threats that will only affect heavy resource-intensive industries, as all industries and geographies are vulnerable.

We look forward to working together with the financial and business community to co-create the knowledge and understanding of 'Linear Risks.'

### IN PRACTICE, WE SUGGEST A SERIES OF FOLLOW-UP ACTIVITIES FROM THIS ESSAY:

- **Collaborate to deepen the understanding of 'Linear Risks'** by building on this essay with risk managers and translate 'Linear Risks' into financial risk management language
- **Understand the short-term and long-term implications of these linear risks** and how they influence the business and financial community across various time scales
- **Create forums with investors and business stakeholders** to test the concept of 'Linear Risks' and work towards a practical implementation agenda to integrate 'Linear Risks' into established enterprise risk management (ERM) processes<sup>24</sup>
- **Specifically address the disclosure challenges of 'Linear Risks'** and explore how the current movement for disclosure of climate change risks<sup>25</sup> in portfolios can serve as a model to incorporate 'Linear Risks'.



24. <https://www.wbcsd.org/Projects/Non-financial-Measurement-and-Valuation/Resources/Applying-enterprise-risk-management>

25. <http://www.wbcsd.org/contentwbc/download/3865/51609>.

# ABOUT THIS ESSAY

The essay is a joint project between Circle Economy, PGGM, KPMG EBRD, and WBCSD.

## About Circle Economy

A social enterprise, Circle Economy accelerates the transition to the circular economy through the development of practical and scalable solutions. Our tools and programs are designed to facilitate decision making and action plans for businesses and governments in a wide range of sectors. [www.circle-economy.com](http://www.circle-economy.com)

## About PGGM

Cooperative PGGM provides asset management, pension management and board advice to institutional clients. On 31 December 2016, PGGM's assets under management for various pension funds totalled EUR 205.8 billion. As a cooperative, PGGM helps its approximately 720,000 members realise a valuable future. On its own and with strategic partners, PGGM also develops innovative facilities for the future by bringing together pension, healthcare, living and working. [www.pggm.nl](http://www.pggm.nl)

## About KPMG

KPMG is a global network of independent member firms offering audit, tax and advisory services. The firms work closely with clients, helping them to mitigate risks and grasp opportunities. Clients include business corporations, governments and public sector agencies and not-for-profit organisations. We advise our clients on the development of circular economy strategy and business modelling to drive the transition to a circular economy. [www.kpmg.com](http://www.kpmg.com)

## About EBRD

The European Bank for Reconstruction and Development (EBRD) is an international financial institution that supports projects in over 30 countries, from eastern Europe to central Asia and the southern and eastern Mediterranean. Investing primarily in private sector clients whose needs cannot be fully met by the market, the EBRD promotes entrepreneurship and fosters transition towards open and democratic market economies. In 2015, the EBRD adopted its Green Economy Transition approach, which seeks to increase the volume of green financing from an average of 24 per cent of EBRD annual business investment in the 10 years up to 2016 to 40 per cent by 2020. [www.ebrd.com](http://www.ebrd.com)

## About WBCSD

WBCSD is a global, CEO-led organisation of over 200 leading businesses working together to accelerate the transition to a sustainable world. Our member companies come from all business sectors and all major economies, representing a combined revenue of more than \$8.5 trillion and 19 million employees. Our Global Network of almost 70 national business councils gives our members unparalleled reach across the globe. Together, we are the leading voice of business for sustainability; united by our vision of a world where more than nine billion people are all living well and within the boundaries of our planet, by 2050. [www.wbcsd.org](http://www.wbcsd.org)

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