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Paradigm Transformers: Six Forces Business Must Address to Achieve Success in the Next Decade

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Abstract

The goal of this paper is to identify how business organizations, in general and in specific cases, address six disruptive forces that are shaping and changing Business Model Innovation (BMI) modelling. These forces, or 'Paradigm Transformers' are artificial intelligence, cryptocurrency and blockchain technology, compliance, chaos planning, governance and global warming. We outline the nature of these forces and highlight several major business organizations which have or are responding to these forces in their planning and execution of BMI. In the Introduction we provide a brief overview of the Paradigm Transformers and in the following six sections of the paper, explore these in depth and demonstrate their integration into business planning. Based on our research, these Paradigm Transformers, when incorporated with business planning sustain and create value for the organization.

Keywords: Business Model Innovation (BMI); Paradigm Transformers; Disruptive Forces.

1. INTRODUCTION

The concept of disruptive technology has existed for almost 30 years (Christensen and Bower 1995). This paper focuses on six variables, the major disruptive forces requiring unique and organization-specific response. Figure 1 below illustrates how these Paradigm Transformers are integrated with fundamental business concepts such as idea development, strategic planning, production development, and execution and sales.

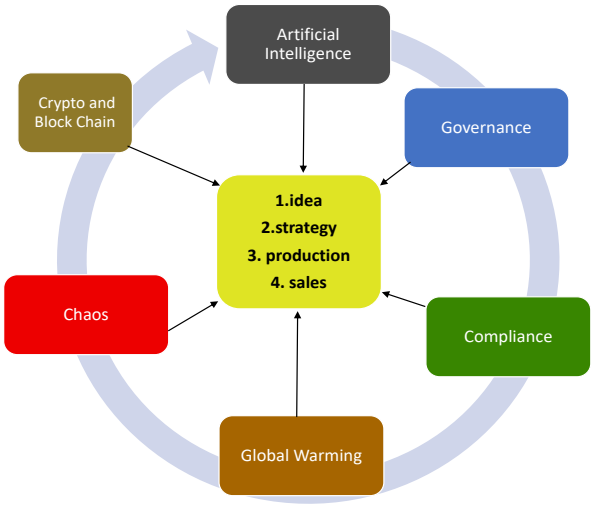

Figure 1. Paradigm Transformers

The first of these six forces is Artificial Intelligence (AI). The term was defined by J. McCarthy as "the science and engineering of making intelligent machines, especially intelligent computer programs" (Dartmouth Workshop 1955). The definition has been modified on countless occasions, but the fundamental premise remains. The second disrupting force, cryptocurrency, includes a wide range of applications and activity but is basically a digital currency secured by cryptography operating on a decentralized network rather than a central bank (Ullah, Shakir,2025). Linked to cryptocurrency is blockchain, a digital database shared across a network of computers and encrypted to ensure security and privacy. The history of blockchain can be traced back to a seminal paper setting out how cryptography could secure digital records to prevent tampering, essentially laying the groundwork for blockchain technology by creating a system to prove a document's existence at a specific time (Haber and Stornetta, 1991). The third disruptive force addressed in this paper is the inclusion of chaos theory to risk management strategy. The application of chaos theory to business risk and uncertainty focused on the occurrence of random events that have underlying patterns that are sensitive to given situations where small changes can lead to unpredictable outcomes (Chambers, 2025). The fourth paradigm Paradigm Transformer is the overwhelming importance of compliance with environmental and social guidelines and regulations. Compliance is today an essential part of any business, large or small. It is more than a token of recognition of social and environmental challenges. It is the foundation for key values in a business and provides a foundation to mitigate risk including financial penalties for noncompliance. Governance is the fifth Paradigm Transformer. The past role of boards of directors, up to the early 2000 s was often passive, acting as an advisory body or 'rubber stamp' for top management rather than truly monitoring or challenging decisions, despite their formal duty to govern. Boards focused on conforming. There was little role in measuring performance and being involved in strategy and innovation (Aguilera and Castillo (2025). Global warming is the sixth disruptive force and impacts business organization in terms of greenhouse (GHG) grass emissions control and adapting to global warming induced severe weather. In addition, many corporations are forced to examine their fossil fuel assets which, in the world converting to renewable fuels, may become stranded (Pasula, 2023).

The goal of the research is two-fold. The first objective is to explain and describe each of the six Paradigm Transformers; how they arose and analysis of these forces from expert testimony. The second part demonstrates how several current businesses have successfully incorporated one or more Paradigm Transformers into their business planning. With a clear understanding of these disruptive forces and their application, an organization, for profit or not for profit, will be able to contemplate how to evaluate and implement and or respond to each Paradigm Transformer.

2. CONCEPTUAL FRAMEWORK

Business model innovation (BMI) is the process of changing how an organization adapts to new market forces, technological advances and societal expectations to survive and thrive in an ever-changing competitive market. Any one of the six Paradigm Transformers noted above will call into question a businesses' current approach to short- and longer-term strategy Given that the goal of our research is to illustrate how Paradigm Transformers can be incorporated into business planning in general and in specific cases, the conceptual framework is a narrative explaining the relationship between a Paradigm Transformer and one of more components of a business plan.

None of these six disruptive forces is confined to one component of a business model; there are ripple effects throughout and beyond the organization. How a business responds to the challenge of mitigating carbon emissions and adapting to weather-related disasters is one example of the

challenge. Understanding the nature of these forces and how established businesses are addressing the disruption can provide direction for businesses of all sizes.

3. METHODOLOGY

To understand how any one of the Paradigm Transformers may influence current business planning, a brief overview of the characteristics of the disruption, the emergence of the Paradigm Transformer and expert testimony provides the base for the empirical work. The empirical work is an analysis of how one or more Paradigm Transformers has been integrated into the planning and culture of a business. The businesses chosen for this analysis are reasonably well known and have existed, in some cases, for decades. They include banking, global engineering services, vehicle parts manufacturing, communications and technology. The approach to the integration of Paradigm Transformers into these businesses was drawn from reports published by the businesses and independent media academic sources.

4. RESULTS

4.1. Artificial Intelligence

There is considerable 'hype' about Artificial Intelligence (AI). The billions of dollars invested in developing AI models is based on extraordinary forecasts of the efficiency gains for society, but business penetrations varied from under three precent to ninety-nine percent depending on the size and classification of the business. Nevertheless, the topic dominates discussions in business, government, and personal venues around the globe. In businesses, the fundamental points centre on: What and where is the best application of AI? Should a company buy, rent or build their own AI software? What will it cost to train staff how to manage and use AI? Does AI adoption lead to massive restructuring of a company's work force? Should companies, part way through the launch of a new or revised strategic plan, re-think the foundations supporting the plan? What are the ethical and privacy issues associated with AI that must be considered if the technology is to be adopted?

Less than a decade ago, Forbes reported that 260 AI start up firms were in existence; a fourteen-fold increase since 2000. Today, there are approximately 70,000 such businesses exploring and/or serving a wide range of business and not for profit organizations (Haan, 2024). There have been a myriad publications related to the implementation of AI in business operations. From this expanding data base, an article on AI principles is noteworthy (Wade and Yokio, 2024). Based on their analysis of a broad range of businesses engaged in AI development the authors suggest that four principles should be followed to ensure a successful integration of AI with a business's current and expected operations. These are:

- *Translate*, or moving ethics statements and goals to the implementation stage,
- *Integrate*, and align key beliefs around AI with multiple departments/teams to ensure compliance and a smooth implementation of software. Be initiative-taking, and develop policies and procedures around concerns e.g. ethics, during the development stage.
- *Calibrate Solutions and Audit* the launch of AI solutions and their effectiveness in terms of meeting goals to 'iron out' any errors or problems.
- *Proliferate Solutions* to ensure transparency of practices where AI is implemented by using study groups, share best practices and encourage participation among individuals in the organization whether they are directly or only indirectly involved in the application of AI.

These broad principles can be adopted by business for procedures and processes such as human resource management, accounting and finance, supply chain networks, product quality control, and marketing. One interesting application of AI occurred recently in Linamar Corporation. Across three machines, Linamar operators were responsible for loading unmachined transmission discs on to the machines' feeder system. Due to labor shortages, Linamar wanted to automate this process. They chose a combination of ABB Robotics industrial robots and Apera AI's Vue robotic vision software. After success with the first cell, the same solution was applied to the remaining two cells (Apera, 2024).

The number of AI software packages for businesses grows day- by -day as illustrated in the table in Appendix 1.

With the entry of new and revised AI software packages, there is a corresponding increase in studies designed to measure the effectiveness of AI in specific applications. Hundreds of AI producers extol the virtues of their product. However, the accuracy, reliability, and security come with independent analysis. A good starting point is a recent publication examining the characteristics of AI software (Jorzik, 2024). The paper reviews 180 articles on the topic of AI and Business Model Innovation (BMI) structured to shed light on evolving research and a framework addressing specific managerial focuses. Among the conclusions drawn from this review, the authors note that AI applications for BMI require a new type of leadership in AI driven companies. Failure of BMI can be explained by ". cultural deficits and a weak mindset toward new machine-human interact on" (Jorzik, p 10). To ensure success with AI there must be an unclouded vision of how AI will align with strategy and at the same time consider an approach whereby AI is introduced in incremental steps. To be successful, the introduction of AI in BMI planning requires thinking about the social value of the technology and its implications for ethical standards.

4.2. Cryptocurrency and Block Chain

4.2.1. *Cryptocurrency*

The idea of digital currency goes back forty years, but crypto currency entered mainstream financial and investment discussions in 2008. Cryptocurrencies have no legislated or intrinsic value; they are simply worth what people are willing to pay for them in the market. The use of Bitcoin, the dominant crypto, stands for 0.64 percent of the world's money supply (Reiff, 2025).

The introduction of specific crypto currencies fifteen years ago generated questions related to the role of the currency in asset portfolio selection, as a substitute for fiat currencies, whether and how should crypto currencies be regulated, the correlation between crypto currency values and prices of various financial assets and environmental concerns regarding the enormous energy drain of coin mining. Since 2009, hundreds of research papers on the topic have been published (Urquhart and Yarovaya, 2023).

The reputation of digital currencies has been placed under a microscope by the collapse of large digital currency funds. Sam Bankman-Fried founded FTX, a crypto currency exchange in 2019 and by 2022 the company had a market value of $ 18 billion. In 2022 the United States Securities and Exchange Commission (SEC) charged the company with fraud and related crimes. Bankman-Fried was convicted by a United States court in November 2023 and in 2024 sentenced to 25 years in prison. He had to give up $ 11 billion of FTX wealth (Bekiempis, 2024). In 2023 alone there were ten major

cryptocurrency failures including Terra Luna (where investors lost $ 60 billion) and stablecoin fund, USDT, which lost 99 percent of its value (Q.ai, 2022).

Crypto currencies and their relationship to money laundering have come under the watchful eye of financial authorities around the globe. It has become such a crucial issue confronting a wide range of businesses and their boards of directors that the Basel Institute on Governance published a guide on the subject (Guy, 2025). While businesses in general work diligently to ensure compliance with laws and regulations, reporting and random tests will add to business costs going forward.

The introductory comments in a paper by the Financial Consumer Agency of Canada (Canada, 2025) states, ". crypto assets are very risky". Established regulated financial institutions have approached crypto currency with wariness. The Royal Bank of Canada's (RBC) move toward cryptocurrencies is cautious but strategic, balancing innovation with the risks of volatility and regulatory uncertainty (Investor Team, 2025). The bank focused on researching Central Bank Digital Currencies (CBDCs), state-backed digital currencies that provide greater stability than decentralized cryptocurrencies. CBDCs also promise to streamline payment systems and improve financial inclusion. This proactive research aligns with the managerial economics principle of preparing for future market shifts and ensuring resource allocation aligns with evolving client needs.

Despite this forward-looking strategy, RBC's implementation of cryptocurrency services remains limited. The bank employs a 'hands-off' approach, relying on third-party vendors to facilitate cryptocurrency transactions. This allows RBC to enter the digital assets market while minimizing direct exposure to the risks associated with handling volatile assets. While this strategy is prudent, it limits RBC's ability to capitalize fully on the growing demand for crypto-related financial products, such as tokenized assets or blockchain-based investment vehicles.

4.2.2. *Blockchain*

Blockchain is a ledger, digitally distributed among agents involved in one or more transactions. The structure of blockchain and how information is exchanged among participants makes the system difficult to alter, be hacked or manipulated by criminals. Originally constructed to ease transactions in crypto currencies, blockchain programs are now widely employed in a range of businesses and other organization around the globe (Systems Analysis Program Development, 2024). Block chain is in part, a substitute for databases and spreadsheets but the methods of data structuring and how data is accessed/transmitted sets it apart from its earlier cousins. A wide range of businesses such as insurance, real estate and vehicle manufacturing apply this technology. Companies that develop blockchains are experimenting with the software to decide its value to the organization's goals. For example, International Business Machines (IBM) has created a Food Trust blockchain to trace the journey that food products take to get to their locations. Where does the value lie in such development? The food industry has seen countless outbreaks of E. coli, salmonella, and listeria when hazardous materials were transferred to foods in the manufacturing process. Formerly, it has taken weeks to find the source of these outbreaks or the cause of sickness from what people were eating. Using blockchain allows brands to track a food product's route from its origin, through each stop it makes to delivery. In addition, these companies can also now see everything else it may have met, allowing the identification of the problem to occur far sooner and therefore potentially saving lives. This is one example of blockchain in practice, but as the authors of one study point out, other forms of blockchain implementation are being examined to appraise the positive features and attraction of the technology (Gaur and Gaiha, 2020). The authors explain the shortcomings of

conventional management systems, highlight how and when errors are likely to occur. This provides a framework to examine the same system in the context of blockchain technology.

Blockchain has found a market by enhancing customer loyalty programs. The Royal Bank of Canada (RBC) implemented the technology to allow real-time updates for customers (Data Insights, 2024). With this system, customers can track and redeem their points seamlessly, making the experience more efficient and user-friendly. For example, by using blockchain's transparent and secure structure, RBC has reduced errors in tracking points while also removing delays that often frustrate customers. Blockchain technology is not costless. It requires significant energy demands, scalability challenges, and complex integration with existing systems. Adopting more energy-efficient blockchain models, enhancing scalability, and simplifying integration processes are key to overcoming these disadvantages.

4.3. Chaos

The strategies and goals for any organization, profit or not-for-profit, should highlight the practice of Enterprise Risk Management (ERM). ERM is a strategic business discipline that supports the achievement of an organization's aims by addressing the full spectrum of risks and managing the combined impact of those risks as an interrelated risk portfolio. Increasingly, the principles of chaos theory are incorporated as part of ERM planning. A crucial difference between risk and chaos is that risk is the probability of a defined event happening, while chaos is a complex, unpredictable, and orderly disorder. Risk analysis is often presented in the context of protocols like a Risk Prioritization Matrix where expected outcomes result in plans to mitigate damages, insure against damages, and alter, if practical, probabilities associated with expected events.

The approach to chaos as part of a business's risk management is vague and fuzzy but ignoring the existence of chaotic events, no matter how remote, can be short sighted. In contrast to traditional risk analysis, one of the founders of chaos theory suggested chaos is a situation when the present determines the future, but the approximate present does not approximately determine the future (Danforth, 2013). While chaos precludes the application of Bernoulli principles of uncertainty, there are patterns associated with chaos that can be part of risk planning to reduce the costs of a chaotic event affecting business.

- One of these signals is to focus on the initial conditions driving any business plan since chaos may emanate from a disturbance in these conditions (Englund, 2009). Chaos theory addresses systems that are dynamic and thus changing over time.
- Second, most chaos events are not periodic and unstable. Such events require a planning and response that is highly flexible.
- Third, despite its complexity a chaotic event may have a simple cause. Identify potential causes is a key characteristic of chaos planning.

Analysis of chaos theory suggests project managers and executives must learn to operate within 'bounded instability' and identify up-front practices that set the stage for project teams, whether co-located or virtual, to be more creative and productive when it comes to reflecting on chaos. Leaders and planning staff should accept the possibility of chaotic events and prepare for such an episode by ensuring that staff are apprised on a regular basis on the progress toward express goals of the organization and any deviations from initial plans.

The Covid pandemic was a classic example of a chaotic event. While the onset sent shockwaves through the business world, some companies in specific sectors were better prepared than others, due to the nature of their business and early adoption of flexible work models. Examples of companies that showed a degree of preparedness or adaptability at the onset of the pandemic include Microsoft, which had plans in place to transition smoothly to remote work. Grocery chains like Kroger and large retailers such as Walmart already had robust operational plans and supply chain coordination that could be adapted to manage increased demand and implement new safety protocols (e.g., social distancing, cleaning). \ Panasonic was an early adopter of cloud computing and developed a comprehensive work-from-home policy and collaboration software years before the pandemic, which eased a smooth transition (Strawer, 2023). Royal Bank of Canada (RBC) was able to revisit a pandemic plan established prior to 2020 that provided immediate guidance for employees, customers, and suppliers on how to respond to the chaos that ensued. (McLaughlin 2020).

In another case, Stantec Corporation set up a pandemic response protocol in 2011 to guide decision-making in the event of an outbreak. "In the case of a pandemic, a Pandemic Committee is formed consisting of qualified Stantec personnel who have the background and expertise to advise on issues surrounding pandemic preparedness and business continuity planning. During an outbreak, the committee oversees the implementation of the pandemic plan and offers advice where needed" (Stantec, 2020). Having a plan 'on the shelf' was instrumental in Stantec's success in supporting operations during the COVID-19 pandemic.

4.4. Compliance: Social And Environmental

One of the earlier pioneers of the concept of Corporate Social Responsibility (CSR) was Howard Bowen who argued that business decisions should be made considering the broader objectives and values of society (Bowen, 1953). The idea was challenged by Chicago economist Milton Friedman who argued: "There is one and only one social responsibility of business; to use its resources and engage in activities designed to increase profit so long as it stays in the rules of the game, which is to say, engages in open and free competition without deception or fraud" (Friedman 1970). Six years later the first business ethics conference was held in the United States at the University of Kansas (University of Kansas 1976).

The nineteen eighties marked an increase in appeals by society for business to be more responsible to needs of the wider community such as the regulation of questionable labor practices by several businesses (Ontario 1980). In 1991 the phrase "Institutional Logic" was coined to pressure businesses to work within a framework of ethics, good governance and concern for the environment (Friedland and Alford, 1991), leading to the replacement of CSR with the phrase, Environment, Social and Governance (ESG).

The principles of ESG are imbedded in the legal requirement for corporate reporting and vary by jurisdiction and type of business. While past ESG disclosures were historically voluntary, new laws and directives are making them mandatory, with potential penalties for non-compliance. The European Union legislated legally binding ESG regulations established the Corporate Sustainable Reporting Directive (CSRD) and the EU

Taxonomy for Sustainable Activities among other directives (Commission Staff 2021). In the United States, the Securities Exchange Commission adopted rules that obliged businesses to report climate risks. The State of California has legislated detailed and strict emissions reporting. A unique piece of legislation in Canada, the *Fighting Against Forced Labour and Child Labour in Supply Chains Act* requires

companies to report annually on how they are preventing forced and child labor in their supply chains (Canada 2024).

In addition to legal directives and regulations, there are international associations which rank organizations according to social and environmental criteria. Independent firms offer corporate ratings and certifications for compliance programs. Compliance is costly, as a recent study highlighted. (Gergely, 2025). The major focus in this study is corporate environmental policies, both voluntary and practices mandated by government. The average of compliance in the United States is $ 12,800 per employee (Metricstream 2025).

4.5. Governance

Governance has been a significant concern and major challenge for boards of directors, boards of governance and boards of trustees in the past decade and will become more complex in the future. Boards are faced with responding to the following agenda.

- Corporate oversight related to new regulation governing AI technology as well as building the ethical framework for Artificial Intelligence in BMI.
- There is growing uncertainty in the world related to geopolitics, wars and emergence of new economic 'blocks.'
- Investors are exerting more pressure on companies to adopt governance practices that go beyond legal requirements.
- Corporations are spending more time and money on the composition of boards of directors, looking to build and support boards with a variety of perspectives, including cultural and social diversity, and generational balancing.
- The rapid emergence of government regulations and mandatory reporting on ESG issues (related to global warming and social responsibility) will require boards to be more active in the establishment of compliance protocols.
- The proliferation of armed conflicts, unexpected and incredibly damaging weather events related to global warming, destabilizing supply chains and the unknown complexity of non-traditional financial flows require boards to become more directly involved in the development of enterprise risk management policy.

How boards will develop protocols to respond to these challenges will differ among businesses. What follows are the approaches by three global corporations.

- *Verizon Corporation* As part of its Corporate Governance Guidelines, the company includes a Corporate Governance and Policy Committee which among other duties, oversees ESG issues, including ESG commitments, reporting and engagement, corporate responsibility, and sustainability (Verizon, 2025). The Committee also watches over the company's position and engagement on important public policy issues, including those relating to political contributions, lobbying activities, and human rights, which may affect our business and reputation. The activities of Verizon's community and social impact initiatives, including philanthropic activities is a responsibility of the Committee.
- *Linamar Corporation***:** The Board of Directors, along with the Human Resources and Corporate Governance (HRGC) Committee, is responsible for aligning corporate governance with the ESG principles (Linamar, 2019). This includes the regular reviewing of key policies such as the Employee Code of Conduct, Ethical Business Conduct Policy, and Whistleblower Policy annually.

This approach ensures there is compliance with ethical behaviour, creating stakeholder trust throughout the organisation. The Senior Executive Group (SEG) plays a pivotal role by integrating governance into strategic decisions. This executive team ensures that policies are not just guidelines, but actionable frameworks tied to the metrics of specific goals, such as sustainability benchmarks linked to leadership compensation. Linamar's Global Operations System (GOS) further reinforces governance by having a standard for all policy creation, updates, and application. Governance also extends to stakeholder engagement. By consulting with regulators, investors, and community partners, Linamar proactively addresses risks and aligns its aims with external expectations. This approach, by collaborating with external groups, shows that effective governance is not confined to internal policies but also involves meaningful engagement with the broader ecosystem across all industries. Significant environmental and process safety issues are also reviewed by the Board's Human Resources and Corporate Governance Committee (HRCG) on a quarterly basis to ensure compliance with the Company's rigorous policies. The HRCG Committee assists the Board to identify, evaluate and monitor public policy trends and environmental issues that could affect the Company's business activities and performance. It also reviews and makes recommendations for Linamar's strategies related to corporate responsibility and reputation management.

- *Chase Manhattan Bank*: Within its governance framework, the Bank has set up a Public Responsibility Committee charged with "oversight and review of the Firm's positions and practices on public responsibility (Public Responsibility Committee, 2025). The policy includes matters such as community investment, fair lending, sustainability, consumer practices, and other public policy issues that reflect the Firm's values and character and impact the Firm's reputation among its stakeholders provide guidance on these matters to management and the Board as appropriate. Within the terms of the Committee, two of the seventeen major duties involve a review of the Firm's policies and practices related to environmental and social matters as well as shareholder proposals involving issues of public interest and public respect.

4.6. Global Warming

Across the globe, addressing the challenges of global warming and the related compliance with environmental, social and governance goals, occupy a significant share of the agenda in most organizations. The regulatory focus is clearly on carbon emissions and what businesses emit; not what they claim they emit. In Europe, the bar for reporting emission accurately has been raised with the appearance of new ESG reporting requirements in 2023 particularly with the passing of the Sustainable Finance Disclosure Regulation in 2021 (European Commission, 2011). In Canada, new regulations in 2024 ushered in fundamental reforms addressing the way companies are held accountable for carbon emissions (Canada, 2025). These will be supported by expected changes to the Canada Business Corporations Act which will require mandatory, climate related financial disclosure for private companies. Recently, in the United States, the Securities and Exchange Commission issued its final climate rules, entitled *The Enhancement and Standardization of Climate-Related Disclosures for Investors*, requiring certain public companies to make disclosures about their climate-related risks and greenhouse gas emissions (Securities and Exchange Commission 2024). While not a leader in ESG reporting standards, Australia's framework for sustainability reporting is now in place after the climate-related financial disclosures legislation received Royal Assent in September 2024 (Australian Treasury, 2024). Mandatory reporting of climate-related disclosures began in the fiscal year on or after January 1, 2025.

While ESG compliance affects the bottom line of business the cost is low compared to the direct expense associated with the damage from global warming induced catastrophic damages as illustrated in Figure 2. From billions it has reached over a trillion dollars U.S. dollars.

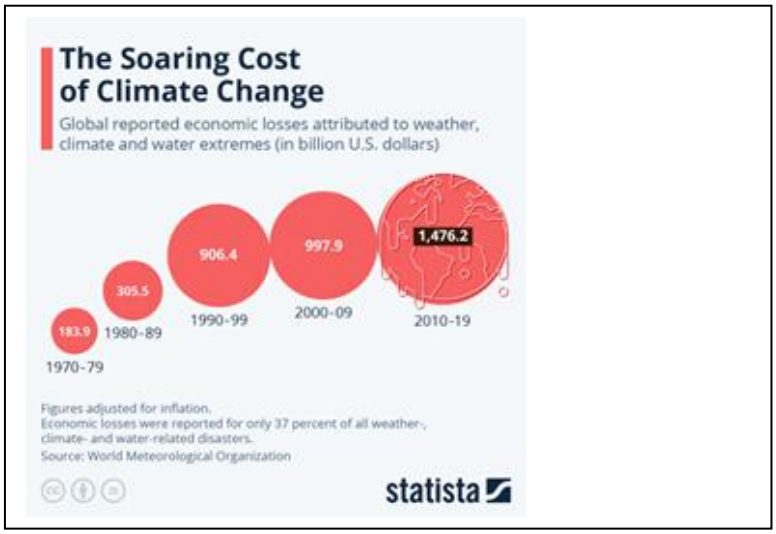

Figure 2. Cost of Climate Change Damage, 1970-79 to 2010-19

Whether these damages occurred in residential, commercial, industrial, or rural property, one way or another, they are businesses costs. In addition to the expense of insurance premiums, businesses have developed climate change adapting processes which add to both capital and operating costs. On the climate change mitigation side of the ledger, carbon taxes, and retooling business models to meet emission target add to these costs.

Most business organizations include the topic of Climate Change in short- and long-term planning but few provide longitudinal data on annual costs to adapt to or mitigate damages associated with global warming. Goals are becoming more focussed as emerging mandatory regulation for business to follow sustainable standards proliferate.

For example, Stantec Corporation, whose business focuses on helping clients develop low carbon emission, water and land stewardship goals, has established a robust climate change program for the company. Internally, Stantec's Sustainability Reports note the company has achieved operational carbon neutrality for the second year in a row (Stantec, 2024). This has been accomplished by consuming renewable energy equivalent to 96% of their operational energy usage and balancing residual emissions by purchasing high-value carbon offset projects like the Great Bear Temperate Rainforest. Real estate carbon emissions have declined 39% relative to 2019 by selecting energy-efficient buildings. Furthermore, Stantec purchased around 90,000 gallons of sustainable aviation fuel for business travel, helping reduce emissions (Stantec, 2022).

Google Corporation's approach to global warming focuses on both adaptation and carbon emission mitigation. Internally, the company, like many business organizations, has a net zero carbon goal. In the shorter term, the primary approach to reducing Scope 2 emissions is to convert to carbon-free energy. In 2020, the goal was to run on 24/7 carbon-free energy every hour of every day on every

grid by 2030 (Environmental Report, 2025). The Company has achieved its goal by buying carbon-free energy, accelerating new and improved technologies, and transforming the energy system through policy, partnerships, and advocacy. Because of the pressure from governments and investors to avoid 'greenwashing Google tracks its progress toward the goal on an annual basis.

5. DISCUSSION AND CONCLUSION

The appearance and strengthening presence of the Paradigm Transformers discussed in this paper do not affect firms or industries equally. Decision makers will find it necessary to change their BMI to accommodate the current and expected disturbances caused by these forces. Not all six forces are new. Artificial Intelligence has passed the childhood stage and is now well proven in the adolescent juncture of existence. Including cryptocurrency and the application of chaos theory to traditional Enterprise Risk Management practices will unfold in diverse ways depending on the the needs of individual businesses. Global warming and its attending weather related catastrophes will demand a strong commitment to adapting to climate change and assigning funds for carbon mitigation. Finally, the costs associated with ESG compliance have risen in the past decade and are likely to put further pressure on BMI to set up formal procedures to avoid reputational risk and financial penalties which noncompliance engenders.

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Appendix 1

Use of artificial intelligence (AI) by selected industries in producing goods or delivering services over the last 12 months, second quarter of 2024

Type of AI application used	All industries	Information and cultural industries	Professional, scientific and technical services	Finance and insurance
	percent of businesses			
AI used in producing goods or delivering services	**6.1**	**20.9**	**13.7**	**10.9**
Natural language processing	28.9	41.3	24.2	30.5
Text analytics using AI	27.0	27.1	37.7	23.7
Virtual agents or chatbots	26.5	26.8	25.4	66.8
Data analytics using AI	25.0	18.4	27.0	34.2
Large language models	21.9	35.2	32.2	28.3
Image or pattern recognition	21.8	15.7	47.1	5.2
Machine learning	20.1	17.3	39.0	12.9
Speech or voice recognition using AI	18.1	28.6	12.5	30.8
Marketing automation using AI	15.2	28.0	16.0	5.9
Recommendation systems using AI	12.3	8.8	17.5	18.2
Decision making systems based on AI	6.1	10.2	1.1	20.9
Machine or computer vision	4.7	7.5	4.7	4.2
Neural networks	4.4	14.9	6.0	2.0
Augmented reality	2.6	2.7	2.5	2.1
Robotics process automation	2.6	2.4	0.9	3.6
Deep learning	1.9	4.9	1.9	2.0
Biometrics	1.0	2.4	0.0	2.5
Other	6.7	18.3	4.3	0.8

Notes: The results in this table are based on the survey that was in collection from April 2 to May 6, 2024, and respondents were asked what the business or organization experienced in the last 12-month period. As a result, those 12 months could range from April 2, 2023, to May 6, 2024, depending on when the business responded.
Source: Statistics Canada. (2024). *Canadian Survey on Business Conditions*, Second Quarter. (Table 33-10-0825-01).