CIBC CAPITAL MARKETS

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September 27, 2022 **ESG**

ESG in Canadian Tech - 2022

Progress Is Green

Sector:
Information Technology

Our Conclusion

Technology is considered one of the most ESG-friendly sectors, with lower environmental risks than other more resource-intensive industries. Companies in the tech sector are increasingly focused on environmental and social measures, generally managing these risks well. We regard data security as one of the biggest risks in the industry and see the potential for additional disclosures around data privacy. We also see governance risks stemming from dual-class share structures and non-independent boards, although expect these risks to lessen over time as pre-IPO shareholders gradually reduce their stakes in the businesses.

Key Points

Increasing Data Usage An Energy Concern – But Renewables Could Offset: As internet traffic continues to surge, data centre workloads and energy use has also continued to rise. By some estimates, the sector emits as much CO_2 as the commercial airline industry. To address the energy consumption challenge, many large tech firms are turning to renewable energy to power data centres. Google derives 56% of its energy from renewable sources and is planning on procuring green energy for its data centres and campuses on a 24/7 basis by the end of the decade.

Combating The "Great Resignation" – A Focus On Culture: We see the social component of ESG as increasingly important as companies look to retain employees in a very tight labour market. Companies under coverage score well on Glassdoor, with an average overall score of 3.9/5. Kinaxis continues to score best-in-class across the Glassdoor metrics.

Controlling Stakeholders & Data Privacy – Governance Opportunities: Three companies under coverage have dual-class share structures, which effectively centralize power in the hands of the controlling stakeholders. In addition, two companies have boards of directors with fewer than 51% independent directors. While significant equity ownership better aligns controlling stakeholder interest with shareholders, under the dual-class structure, holders of common shares have little influence over the strategic direction of the firm or input into potential changes in the corporate structure. We expect that these issues may resolve themselves over time as pre-IPO shareholders gradually reduce their stakes in the business.

We consider data security the other major governance risk. We expect to see more disclosures around data privacy and security given the abundance of data collected and stored. We also see this as a revenue opportunity for some companies under coverage – including Magnet Forensics, Open Text and CGI.

All figures in Canadian dollars unless otherwise stated.

For required regulatory disclosures please refer to "Important Disclosures" beginning on page 16.

Scores Well On The "E"

The technology sector generally scores well on environmental measures, comparing favorably to more resource-intensive industries. Within our coverage, 54% of companies provide ESG reports, including Descartes and Docebo, which released their inaugural ESG reports this year.

The need to standardize disclosure is becoming a focal point for investors as they demand data transparency and comparability. We expect that an increasing number of companies within our coverage will begin to adhere to major ESG reporting standards such as the IFRS' ISSB (International Sustainability Standards Board) and Task Force on Climate-related Financial Disclosures (TCFD). Open Text, CGI and TELUS International score the highest in terms of environmental disclosures. Kinaxis and Docebo are also among the strongest ESG reporters, demonstrating that strong ESG governance can be achieved within smaller companies.

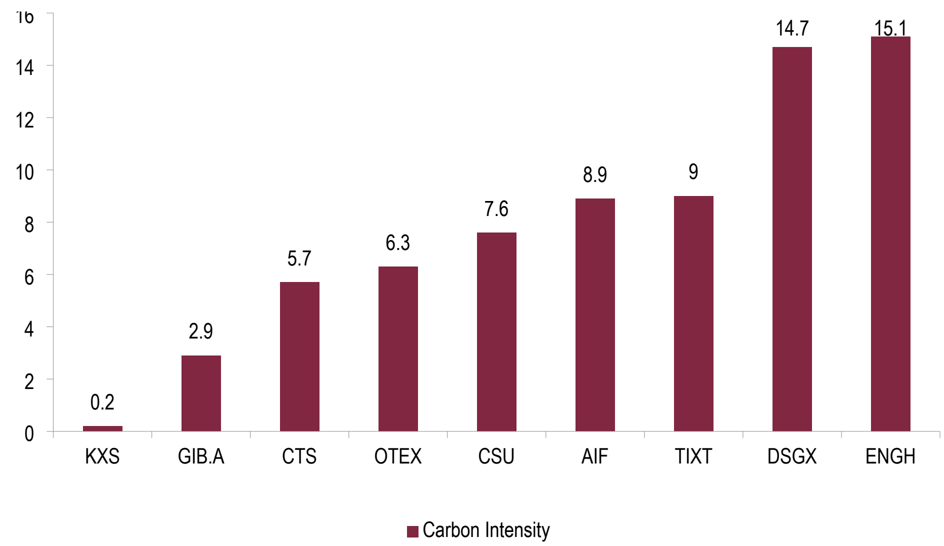
Exhibit 1: Software & Services – Disclosure Of Environmental Metrics, 2021

	Environment Disclosure					Data Availability				Targets		
Ticker	ESG Report	SASB	GRI	TCFD	UN SDGs	Climate Risks	Energy Usage	Water Consumption	Waste Management	GHG Reduction	Energy Reduction	Net-Zero Goals
AIF	✓	✓	×	×	×	✓	✓	✓	✓	×	×	×
CSU	×	×	×	×	×	×	×	×	×	×	×	×
CTS	×	×	×	×	×	×	×	×	×	×	×	×
DCBO	✓	✓	×	×	✓	✓	✓	✓	×	×	×	✓
DSGX	✓	×	×	×	×	×	×	×	×	×	×	×
ENGH	×	×	×	×	×	×	×	×	×	×	×	×
GIB.A	✓	✓	✓	×	✓	✓	✓	✓	✓	✓	✓	✓
KXS	✓	✓	×	×	✓	✓	✓	×	×	✓	×	✓
MAGT	×	×	×	×	×	×	×	×	×	×	×	×
OTEX	✓	×	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
QFOR	×	×	×	×	×	×	×	×	×	×	×	×
SFTC	×	×	×	×	×	×	✓	×	✓	×	×	×
TIXT	✓	×	×	×	✓	✓	✓	✓	✓	×	×	×

Source: Company reports, FactSet, Bloomberg and CIBC World Markets Inc.

For companies within our coverage, we examined the carbon intensity to assess environmental impact. We have standardized the definition of carbon intensity as Scope 1 + 2 emissions divided by total revenue (tonnes per million $ revenue). According to CIBC's proprietary Carbon Tracker, the technology sector scores well with an average carbon intensity of 5.9 tCO2e/$MM, the second lowest emissions intensity of all 11 GIC sectors after Financials. Within our coverage, KXS became the first company to achieve carbon neutrality, well on its way to realizing its net-zero commitment.

Exhibit 2: CIBC Carbon Tracker – Carbon Intensity, September 2022 (tCO2e/$MM)



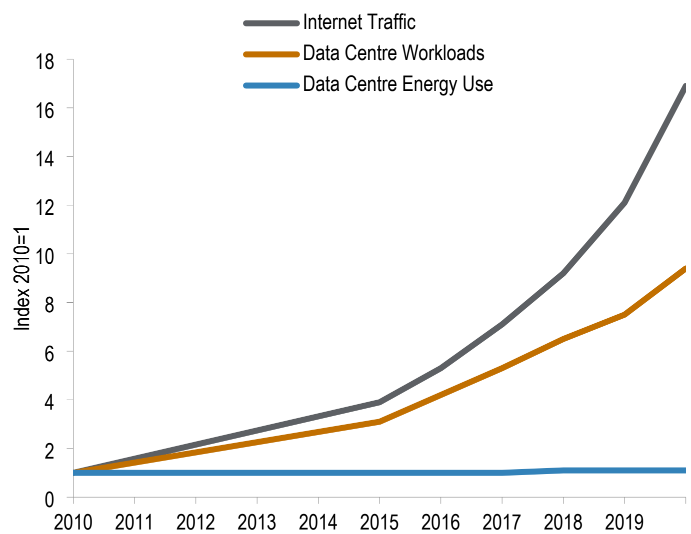
Source: FactSet, Company reports and **CIBC Carbon Tracker**

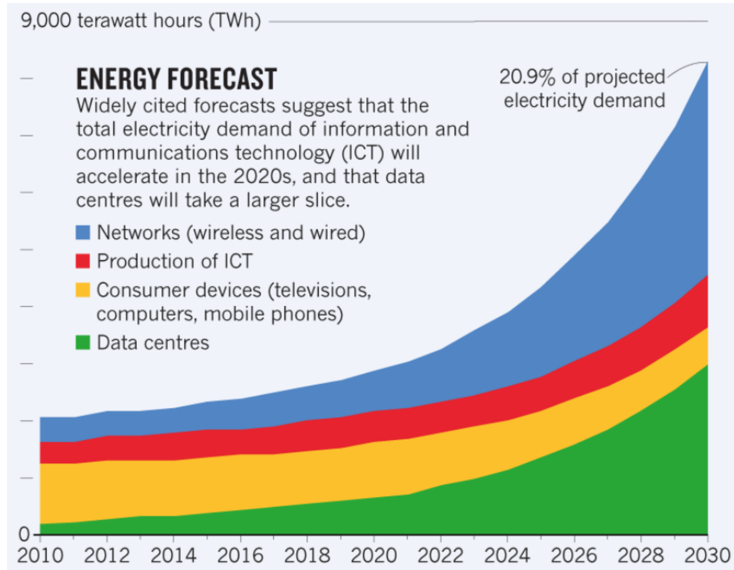
In terms of environmental concerns, one of the largest issues in the tech sector is energy usage, especially within data centers. We see energy efficiency as an increasing focus in the industry, especially given the current energy crisis in Europe. As European countries look to reduce energy consumption, Ireland recently instituted a moratorium on data center construction. A little over half of our coverage discloses energy usage, with four companies documenting net-zero goals. Below we look at the factors impacting energy consumption within the technology sector.

Growing Internet Traffic, Use In AI And Crypto Lead To Rising Energy Consumption

As displayed in the left-hand line chart in Exhibit 3, internet traffic continues to surge (+40% in 2020 alone) given increased video streaming, online gaming and conferencing, and the growth in internet users. As IP traffic mostly flows through data centres, the industry is seeing increased energy consumption.

Exhibit 3: Trends On Internet Traffic, Data Centres Workloads, And Data Centre Energy Use – 2010-2020 (left); Energy Forecast For Information Tech & Communication Technology Sector 2010-2030 (right)





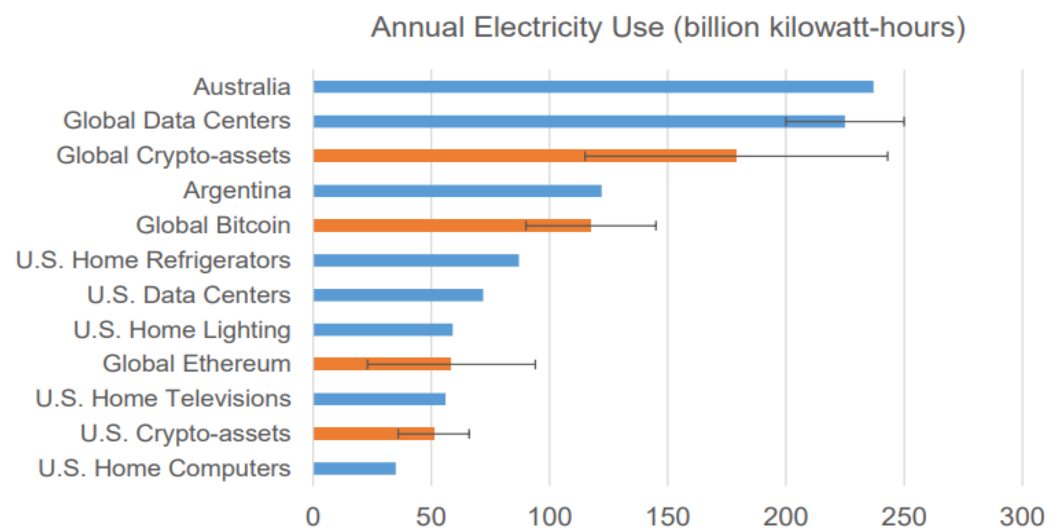
Source: IEA, Nature.com and CIBC World Markets Inc.

According to AKCP, industry wide, data centers' annual electricity usage is estimated to be between 196 billion-400 billion kWh, equating to 1%-2% of worldwide total consumption and emitting as much CO_2 as the commercial airline industry. As of 2020, there are an estimated 18 million in-service data centres across the globe, up from 11 million in 2006.

As shown on the right-side chart in Exhibit 3, data centres are expected to encompass an increasing portion of the energy utilized by the information and communications technology (ICT) sector. A base-case scenario of energy use by the ICT sector suggests that it could represent 21% (best case is 8%) of global electricity demand by 2030.

Crypto is another driver of increased energy usage within the sector. According to a White House study, total global electricity usage by crypto-assets is between 120 billion-240 billion kWh/year, surpassing the annual electricity usage of Argentina. As noted in the bar chart in Exhibit 4, the energy usage for crypto-assets are almost comparable to those used in conventional data centres globally.

Exhibit 4: Annual Electricity Use (Billion kWh) For Data Centres & Crypto Assets – August 2022

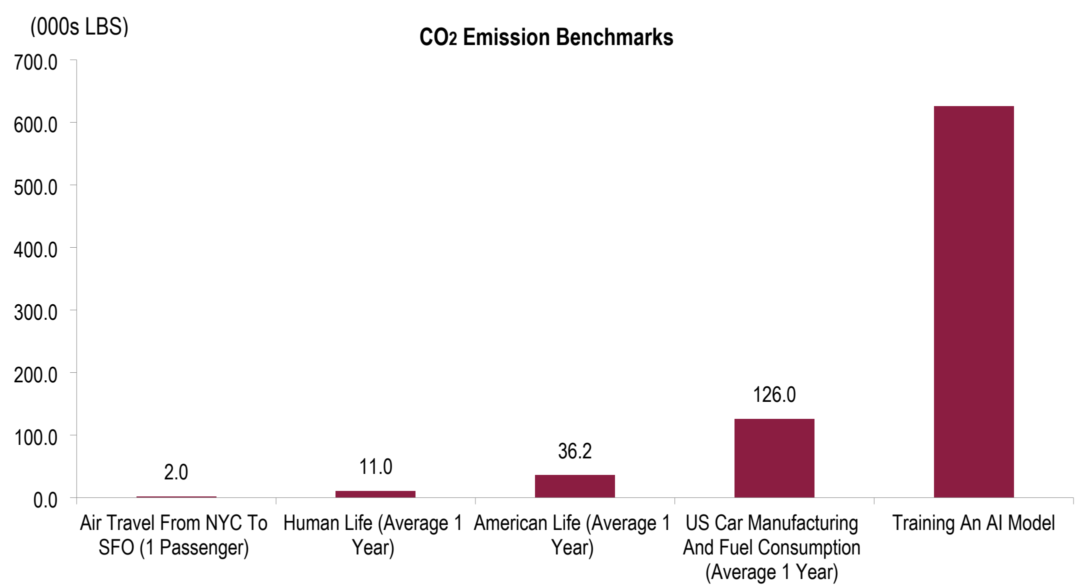


Note: Error bars represents the best range of estimates for crypto-assets.

Source: White House

AI is another energy intensive business. In the Exhibit 5 bar chart, we highlight the carbon footprint of a typical AI model training, which is five times as large as that of car manufacturing. As we move into the age of AI implementation, the computing power required for AI programs will rapidly grow. For example, DeepMind's AlphaZero doubled in its computing power every 3.4 months.

Exhibit 5: CO_2 Emission Benchmarks (000s LBS) – AI Model Training Put Into Perspective – September 2022



Source: CityWire and CIBC World Markets Inc.

Technological Advancement & Energy Efficiency Improvement Should Offset Increase In Energy Usage

Rising energy usage has been partially offset by improved energy efficiency, with improvements occurring across the entire value chain, including servers, storage devices, and networking switches. The proliferation of highly efficient hyperscale data centres with low power usage effectiveness (PUE) of ~1.1 (compared to overall average of 1.8) has also been a contributing factor.

Large tech companies' renewable energy initiatives have traditionally consisted of buying renewable power purchase agreements (PPAs). However, carbon neutrality pledges are difficult to achieve through purchasing credits alone.

Exhibit 6: Sources of Energy For Top Cloud Companies Vs. U.S., China, and Germany – September 2022

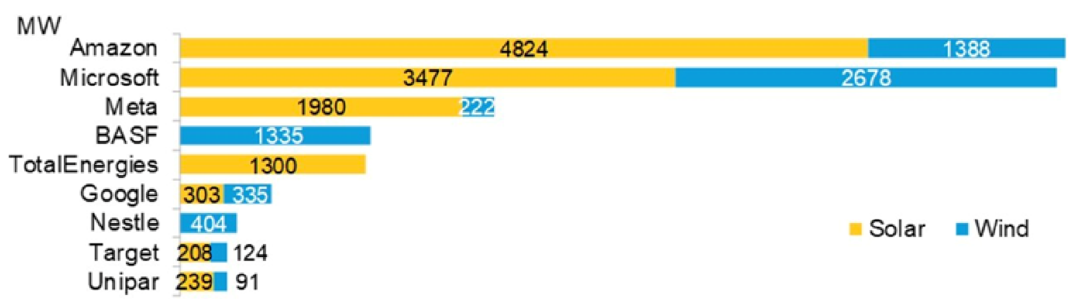
Consumer	Renewable (%)	Gas (%)	Coal (%)	Nuclear (%)
China	22%	3%	65%	4%
Amazon-AWS	17%	24%	30%	26%
Germany	40%	7%	38%	13%
Google	56%	14 %	15 %	10%
United States	17%	35%	27%	19 %
Microsoft	32%	23%	31%	10%

Source: MIT, CityWire and CIBC World Markets Inc.

Google is exploring a new strategy to match electricity usage with clean energy supply. This goes beyond the traditional method of purchasing clean energy through power purchase agreements, and requires investments in cleantech technologies. The plan includes procuring green energy for its data centres and campuses on a 24/7 basis by end of this decade. In May, the company partnered with start-up Fervo for a new geothermal project in Nevada to service local data centres.

Microsoft, the second largest purchaser of clean energy in 2021, has also begun its shift towards a 24/7 clean energy future.

Exhibit 7: Top Corporate Buyers Of Clean Energy – 2021



Note: Excludes onsite PPAs & data is based on publicly available information.

Source: BloombergNEF

"Social" Analysis – Diversity & Culture Matters

A Focus On Employee Satisfaction As A Proxy For Turnover

As the "great resignation" continues, the focus has turned to employee retention in a very tight labour market. We believe that companies with strong cultures are better able to retain talent, helping to contain wage costs in an era of wage inflation. As noted in the Exhibit 8 table, companies under coverage score well on Glassdoor, with an average overall score of 3.9/5. Kinaxis continues to score best-in-class across the Glassdoor metrics.

Exhibit 8: Software & Services Coverage Universe – GlassDoor Employee Satisfaction - As Of September 13, 2022

		Employee Ratings (Glassdoor - overall)					
	# of Reviews on Glassdoor	May-21	Sep-22	Y/Y	Culture & Value Score (Glassdoor)	% Likely To Recommend To A Friend	Approval Of CEO
KXS	261	4.6	4.5	↓	4.8	93%	97%
DCBO	169	4.4	4.3	↓	4.2	81%	87%
CSU	81	3.4	4.1	↑	3.9	82%	98%
CTS	21	N/A	4.0	N/A	4.0	91%	NA
MAGT	46	N/A	4.0	N/A	4.2	75%	81%
SFTC	978	N/A	4.0	N/A	4.3	86%	94%
AIF	500	3.9	3.9	-	3.8	73%	86%
DSGX	142	4.2	3.9	↓	3.9	79%	81%
GIB.A	14,000	3.8	3.9	↑	4.0	81%	90%
QFOR	140	N/A	3.9	N/A	4.1	78%	90%
TIXT	2,200	3.8	3.8	-	3.7	76%	83%
OTEX	3,500	3.5	3.7	↑	3.7	71%	80%
ENGH	139	3.3	3.2	↓	2.9	51%	61%
Average		**3.9**	**3.9**		**4.0**	**78%**	**86%**

Note: CTS, MAGT, SFTC, and QFOR were not included in our 2021 ESG report thus the May 2021 employee ratings are not available.

Source: GlassDoor and CIBC World Markets Inc.

Progress On Diversity Initiatives

In Exhibit 9 table, we highlight the progress made by our covered companies on diversity and inclusion over the past year. Female representation on both the board and executive management teams have increased Y/Y. Most notably, female representation on the board has increased in 10 out of 13 of our covered names (up from 22% to 32% on average). AIF has now 50% female representation on the board, the highest within our coverage.

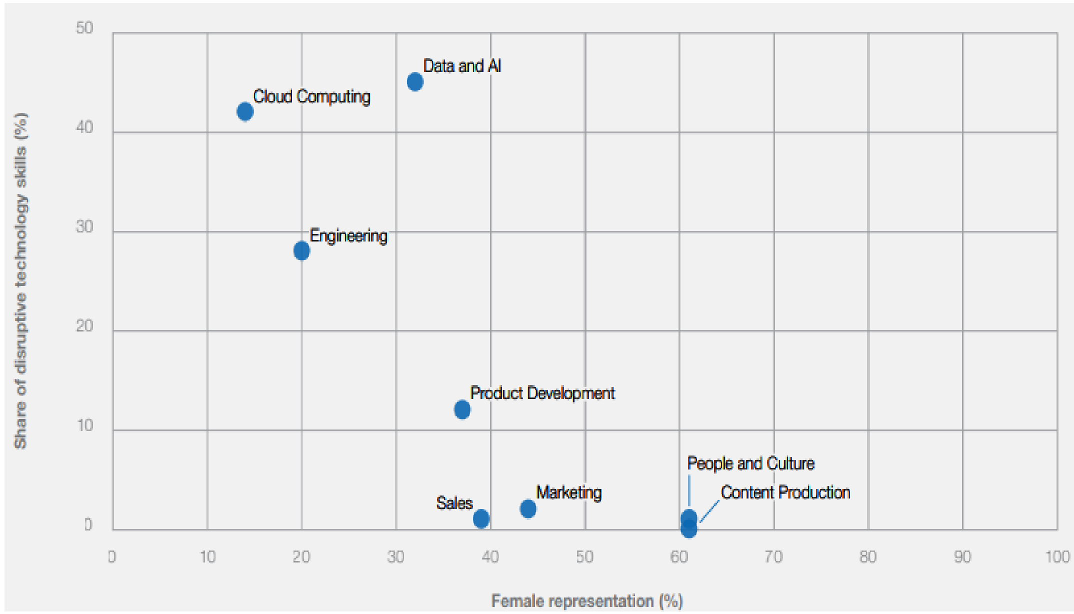
Exhibit 9: Female Representation On Board And Executive Leadership Team – 2021 Vs. 2022

	Female % - Board			Female % - Executive Management			
	2021	2022	Y/Y Change	2021	2022	Y/Y Change	Commitment To Minimum Target On Female % On Board/Leadership
AIF	38%	50%	↑	20%	30%	↑	Minimum 30% Women On Board
CSU	20%	33%	↑	0%	0%	-	N/A
CTS	0%	29%	↑	0%	14%	↑	N/A
DCBO	29%	29%	-	29%	29%	-	N/A
DSGX	25%	40%	↑	0%	0%	-	N/A
ENGH	14%	29%	↑	13%	13%	-	N/A
GIB.A	31%	31%	↑	19%	19%	↑	Minimum 30% Women On Board
KXS	38%	38%	-	22%	18%	↓	Minimum 30% Women On Board
MAGT	20%	20%	-	15%	23%	↑	Minimum 30% Women On Board
OTEX	27%	33%	↑	7%	30%	↑	Minimum 40% Women In Leadership Roles
QFOR	20%	33%	↑	33%	33%	-	N/A
SFTC	14%	25%	↑	25%	N/A	N/A	N/A
TIXT	13%	27%	↑	43%	38%	↓	Minimum 30% Women On Board
Average	**22%**	**32%**		**17%**	**21%**		

Source: Company reports and CIBC World Markets Inc.

With the U.S. Department of Labor noting in 2020 that women make up only 25% of professional computing occupations and 28% of STEM jobs, we see the need for school outreach, equity and inclusion (DEI) policies and a well thought-out talent feeder pipeline as crucial for women to comprise an increasing percentage of executive management within the technology sector. Today, only 21% of executive leadership roles are filled by women within our coverage.

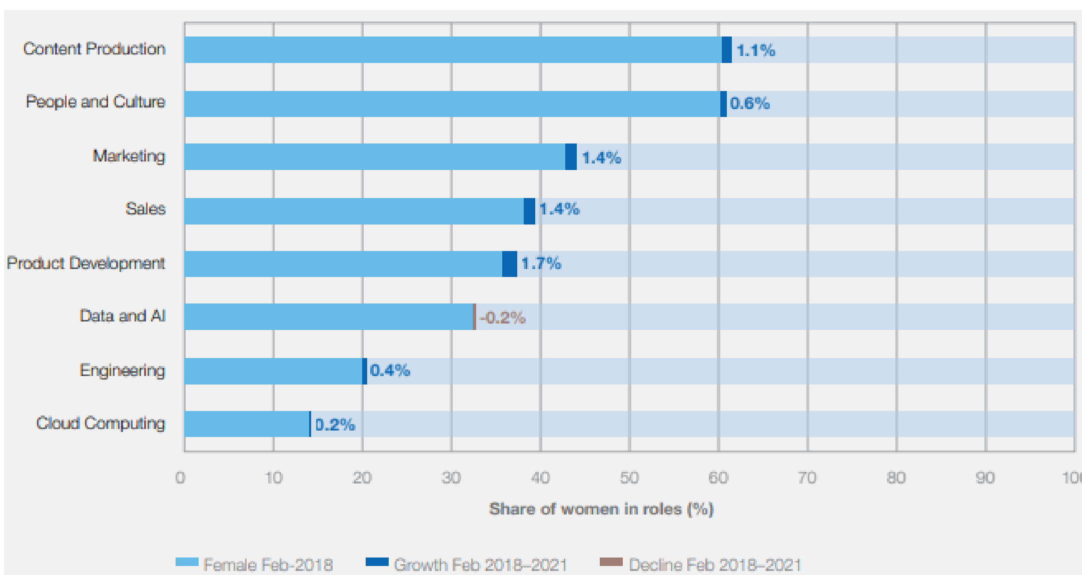
Exhibit 10: Female Representation In Emerging Job Clusters – March 2021



Source: World Economic Forum, and LinkedIn Economic Group

The gender gap could widen going forward as we examine gender disparity in high-growth job categories. According to the 2021 Global Gender Gap Report by World Economic Forum, female representation is particularly low for fields that require disruptive technical skills (Exhibit 10). In Cloud Computing, women only account for 14.2% of the workforce. Over a three-year span, the figure improved only a mere 0.2%, as shown in the Exhibit 11 bar chart.

Exhibit 11: Change In Gender Composition Of Emerging Jobs, Feb 2018– Feb 2021

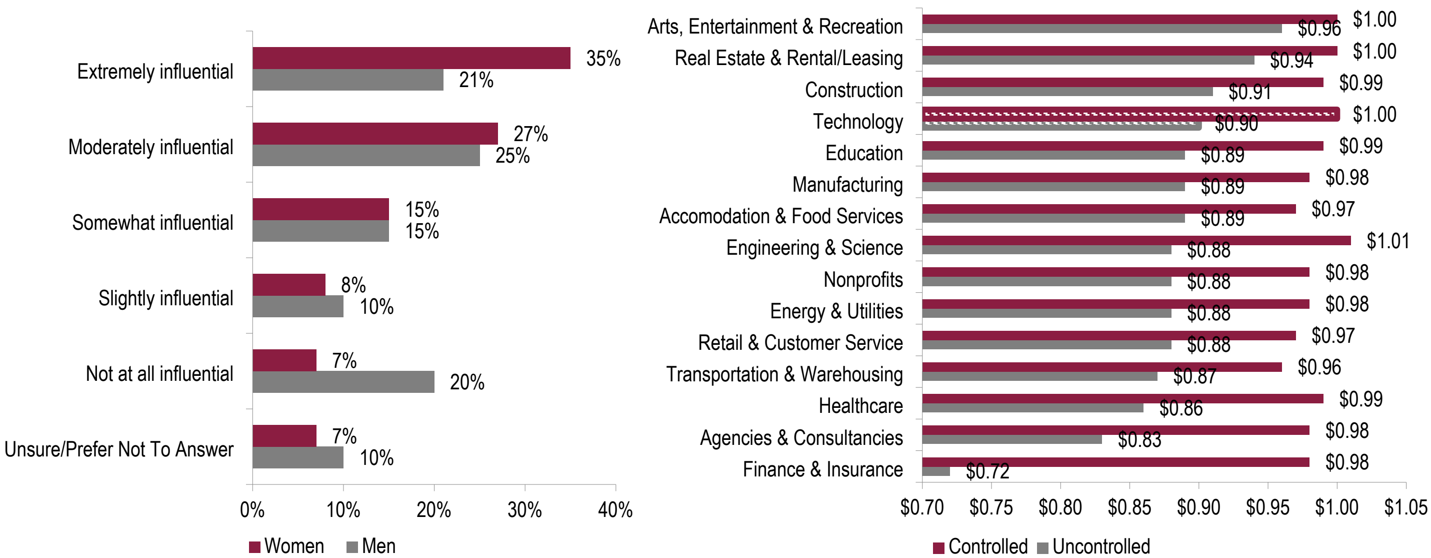


Source: World Economic Forum, and LinkedIn Economic Group

Tech Industry At Gender Pay Parity

While the number of women in the technology sector remains on the low side, the women in the industry have achieved pay equity, as noted in Exhibit 12 (right bar chart). The tech industry is well positioned to incorporate and disclose compensation data, potentially an ESG area where the industry can outperform. Currently, the majority of U.S. corporations do not disclose gender pay gap, with Just Capital noting that only a quarter of the 954 major U.S. companies disclosed the data, and 75 reported exact pay ratios. Select cities and states are beginning to push for data availability to address the gap, including NYC, which plans to mandate companies to disclose the pay range on job listings.

Exhibit 12: Employer Reputation On Diversity Impacts Employees' Employment Decision – March 2022 - (left); PayScale 2022 Gender Pay Gap By Industry (right)



Source: Dice.com, Payscale and CIBC World Markets Inc.

“Governance” Analysis – Share Capital Structure, Board Oversight, Data Protection, Are Key

Dual-class Share Structure Continues To Be A Focus

Within our coverage, three companies have dual-class share structures. Dual-class share structures effectively centralize power in the hands of the controlling shareholders. While the significant equity ownership better aligns the controlling interest with shareholders, holders of common shares have little influence over the strategic direction of the firm or input in potential changes to the corporate structure. Further, securities with limited voting shares available in the public market face increasing risk of removal from indices, as evidenced by FTSE’s recently implemented 5% voting threshold. That being said, given the prevalence of dual-class share structures in Canada, we believe the S&P/TSX is unlikely to follow FTSE’s lead.

Exhibit 13: Dual Class Share Structure & Insider Ownership % – 09/22

Ticker	Dual Class Shares	Economic Value of Multiple Voting Shares %	Voting Power of Multiple Voting Shares %	Insider Ownership %
MAGT	✓	71%	96%	75.0%
TIXT	✓	75%	97%	56.2%
SFTC	×	-	-	49.8%
DCBO	×	-	-	48.1%
QFOR	×	-	-	36.5%
ENGH	×	-	-	22.6%
GIB/A	✓	11%	55%	11.8%
CTS	×	-	-	7.9%
CSU	×	-	-	7.0%
OTEX	×	-	-	1.5%
KXS	×	-	-	1.4%
AIF	×	-	-	0.6%
DSG	×	-	-	0.4%

Source: Company reports, Bloomberg, FactSet and CIBC World Markets Inc.

Board Independence, Chairman-CEO Separation, And CEO Compensation

Board independence is another governance area that is influenced by controlling shareholders. As noted in Exhibit 14, companies with pre-IPO shareholders that have maintained a significant stake in the business post-IPO typically have fewer independent directors on their boards, with the two boards of companies under coverage comprised of a majority of non-independent directors. We assume that the board composition of these firms will change over time as larger pre-IPO shareholders gradually reduce their stakes in the business.

Exhibit 14: Board Independence And CEO & Board Chair Duality & CEO Compensation – 2022 (Market Cap Priced As Of September 13, 2022)

	% of Independent Directors On Board	CEO & Board Chair Duality (Y/N)	CEO Compensation As % Of Market Cap	CEO Compensation As % Of Revenue
AIF	90%	N	0.1%	0.4%
DSGX	90%	N	0.1%	1.4%
KXS	88%	N	0.1%	1.7%
ENGH	86%	Y	0.4%	1.4%
OTEX	83%	N	0.2%	0.5%
QFOR	83%	N	0.4%	1.1%
GIB.A	75%	N	0.1%	0.1%
CTS	71%	N	0.1%	0.1%
DCBO	71%	N	0.1%	1.1%
CSU	60%	N	0.0%	0.0%
MAGT	60%	N	0.1%	1.3%
SFTC	50%	N	0.1%	0.1%
TIXT	36%	N	0.2%	0.7%
Average	**73%**		**0.2%**	**0.8%**

Note: Market Cap Priced As Of Sept 13, 2022

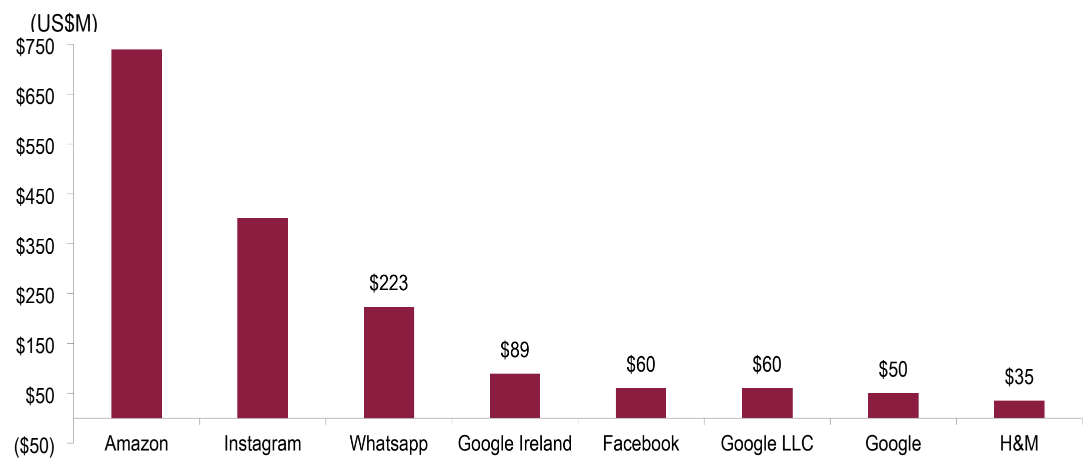
Source: Company reports, FactSet and CIBC World Markets Inc.

Data Breaches A Rising Concern

With the heightened number of cybersecurity attacks globally over the last year and the increasing amount of data collected and stored, we expect data privacy and security disclosures to garner further attention. Customers are becoming increasingly aware of, and sensitive to, the personal data collected, stored and shared with third parties, with a data breach or an unauthorized sharing of personal data potentially leading to long-lasting reputational risks.

We expect data privacy regulation to continue to grow. As of September 2022, fines for breaching EU privacy laws reached €2.1B since the law's introduction in January 2018 (according to enforcementtracker.com). In August, French adtech giant Criteo was fined €60 million for GDPR violation. GDPR fines can be up to 4% of target's global revenue or €20 million (whichever is higher), with Amazon and Instagram seeing the largest fines so far.

Exhibit 15: Highest Fines For Breaching One Or More Articles Under GDPR – As of September 6, 2022



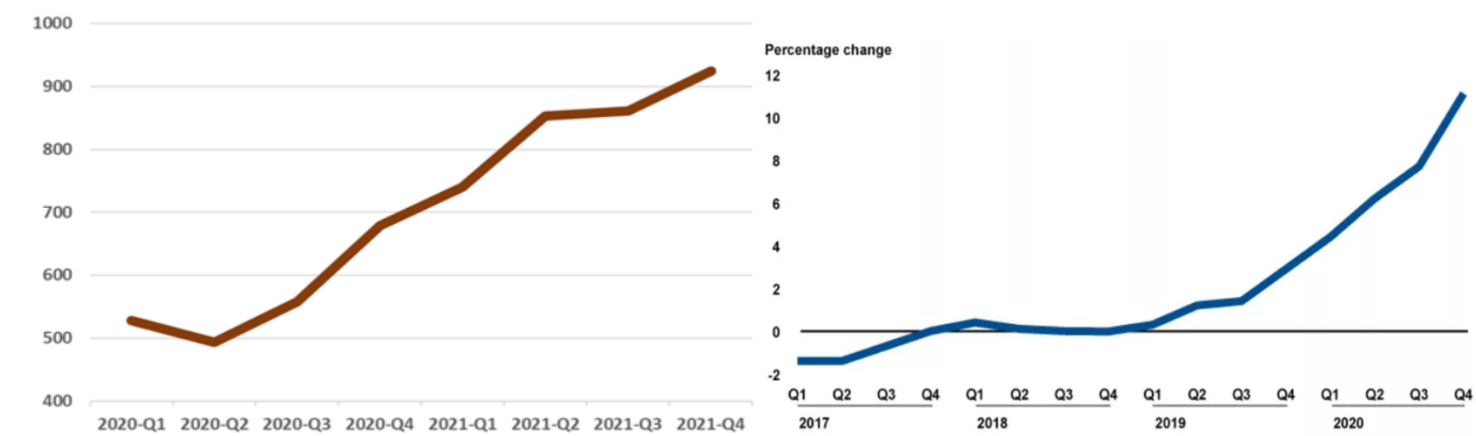
Note: Currency converted from euro to USD as of September 6, 2022

Source: The CMS GDPR Enforcement Tracker, Statista and CIBC World Markets Inc.

Data Protection Investment Is A Defense-Offense Play

Cyber security attacks continue to increase, with the cost of the attacks doubling between 2016 and 2019, as noted in Exhibit 16. The cost of cyber insurance also rising, with a 2021 report released by the U.S. Government Accountability Office (GAO), noting that insurance clients are increasingly opting-in for cyber coverage, up from 26% in 2016 to 47% in 2020.

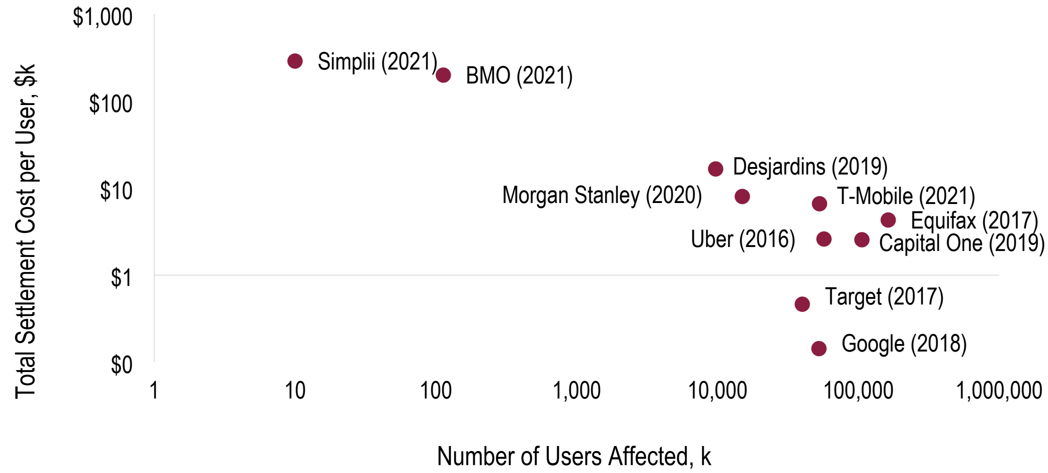
Exhibit 16: Global Weekly Cyber Attacks Per Organization – 2020-2021- (left); GOA - Change In Cyber Insurance Premiums – 2017-2020 (right)



Source: Checkpoint, U.S. Government Accountability Office and CIBC World Markets Inc.

The cost of data breaches are not only quantified solely in fines, lawsuits, ransom payments, and share underperformance, the reputational and brand value damage are also notable. Thus, we see higher investment in data security as a structural shift. Companies are also increasingly highlighting their data privacy policies and undergoing certifications to demonstrate network resilience to assuage customers and to qualify for insurance coverage.

Exhibit 17: Data Governance – Data Breach Penalties, As of August 2, 2022



Source: Company reports and CIBC World Markets Inc.

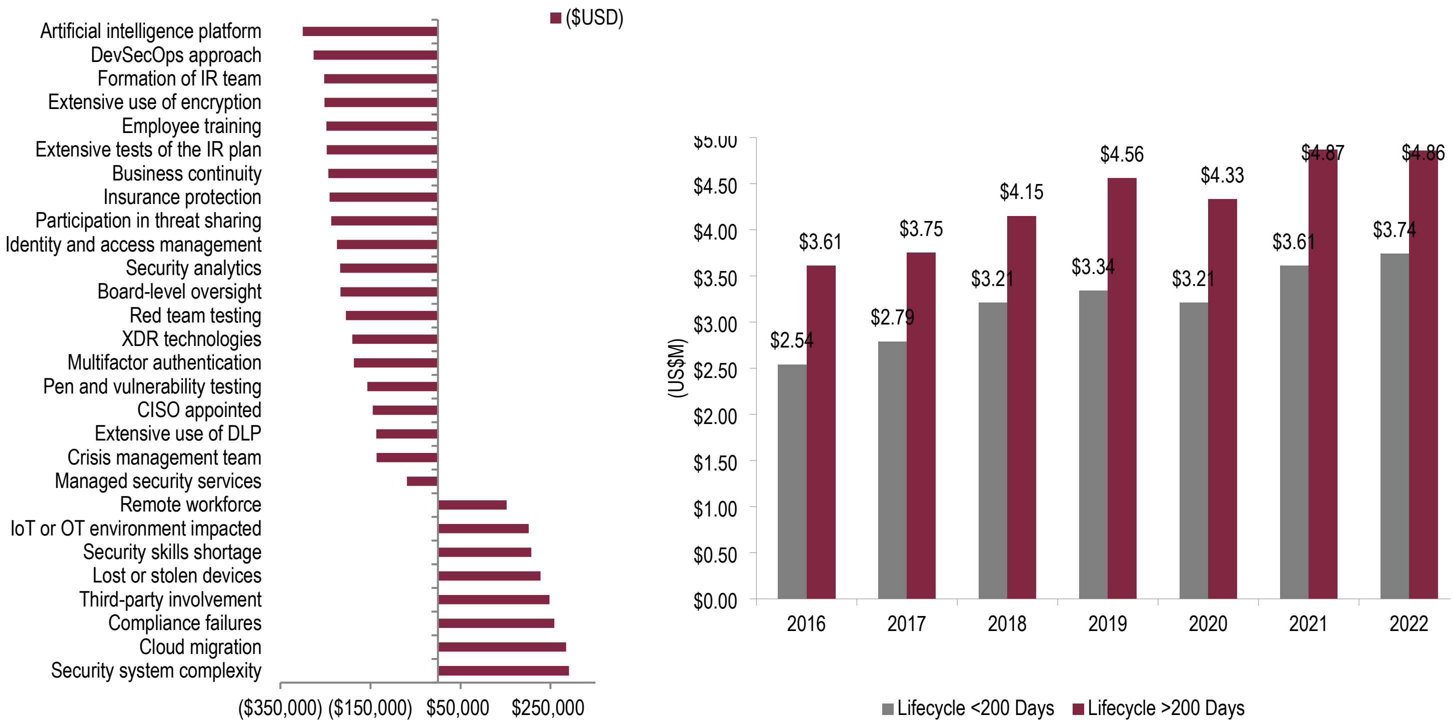
Expect Security Spending To Continue

We expect data security spending to continue to increase in the current environment, with Gartner noting that data security spending was up 12% in 2021. The fastest growing pocket is cloud security at 41%, driven by the rising usage of non-PC devices interacting with core business processes.

We see some data security spending focused on reducing the impact of data breaches, for example, the formation of an incident response (IR) team reduces the cost of an average data breach by 6% or US$253k. Effective detection and containment strategies, which lead to shorter data breach lifecycles are also associated with lower data breach damages, as shown in the Exhibit 18 bar charts.

Moving forward, cyber resilience and related investments will become more prominent assessments for operators and investors alike. More stringent data protection hurdles requires increased opex going forward.

Exhibit 18: Impact Of Key Factors On The Average Total Cost Of A Data Breach – 2022 - (left); Average Cost Of A Data Breach Based On Lifecycle (right)



Source: Ponemon Institute, IBM and CIBC World Markets Inc.

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Neutral	NT	Stock is expected to perform in line with similar stocks in the coverage universe during the next 12-18 months.
Underperformer	UN	Stock is expected to underperform similar stocks in the coverage universe during the next 12-18 months.
Tender	TR	Shareholders are advised to tender shares to a specific offer as we do not believe a superior offer will materialize.
Not Rated	NR	CIBC World Markets does not maintain an investment recommendation on the stock.
Restricted	R	CIBC World Markets is restricted (due to potential conflict of interest) from rating the stock.

Sector Ratings	Abbreviation	Description
Overweight	O	Sector is expected to outperform the broader market averages.
Marketweight	M	Sector is expected to equal the performance of the broader market averages.
Underweight	U	Sector is expected to underperform the broader market averages.
None	NA	Sector rating is not applicable.

Note: Broader market averages refer to S&P 500 in the U.S. and S&P/TSX Composite in Canada.

CIBC World Markets Inc. Price Chart

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