

EQUITY RESEARCH

September 29, 2022

Industry Update

With Great AI Comes Great Responsibility – Bits & Bytes Weekly

We Test OpenAI's Image And Text Generator

Our Conclusion

Could this weekly be auto-generated? CIBC's interested authors recently had the opportunity to test some of OpenAI's tools. We are not the first to do so, with law firms testing OpenAI's playground feature, which uses predictive text to draft contracts, and companies such as Heinz and Nestlé testing OpenAI's DALL-E and DALL-E-2 image generator as part of their marketing campaigns. While AI cannot yet ghost-write Bits & Bytes, the technology continues to improve, bringing with it inherent moral and ethical issues that still need to be resolved.

Key Points

Founded by a team including Sam Altman and Elon Musk and backed by Microsoft and other notable VC firms, OpenAI is a world leader in deep learning, a form of artificial intelligence that uses neural networks. When founded in 2015, the goal was to operate as a not-for-profit to foster the development of pro-social AI for the benefit of all. As of 2019, OpenAI announced its transition to a "capped-profit" company. Under this structure, investors can earn up to 100x their investment, but no more than that. The lab noted struggles with talent acquisition as the reason for the change.

Recently, OpenAI unveiled its DALL-E-2 platform, one that allows for face editing using an AI-powered image-generating system and an Outpainting feature that can generate visuals that expand the borders of an existing picture. This technology is already making its way into the marketing toolkit of iconic brands like Heinz, Nestlé, and Gucci. Other tools advancing deep learning include 'Whisper,' a speech recognition system that enables transcription in numerous languages as well as translation to English, and 'Playground,' a predictive language tool that features AIs trained to complete or respond to your text in the most human way possible. This tool can allow the AI to generate new text on any topic of interest and even edit or paraphrase text that is copied from another source.

The global AI market was valued at US\$93.5B in 2021 and is projected to grow at a CAGR of 38.1% from 2022 to 2030, according to Grandview Research, and there is no shortage of innovation under way to take a share of that growth. That being said, moral and ethical questions remain. An OpenAI competitor released an open source image editor that was used to create non-consensual deepfakes of celebrities like Emma Watson. OpenAI tested the DALL-E-2 platform in beta mode to better train its filtering technology after learning from these examples. Only time will tell how well the company is able to utilize its filtering tech to remove harmful content.

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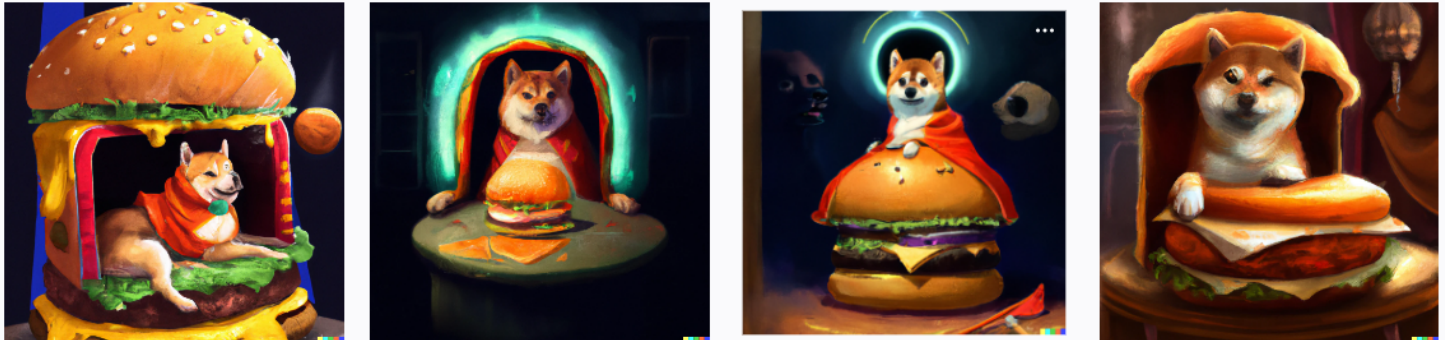
Sector:
Information Technology

Our Experience With OpenAI's 'DALL-E' Platform

We were able to test the DALL-E platform for research purposes. When searching “**A Fortune-telling Shiba Inu Reading Your Fate In A Giant Hamburger, Digital Art,**” DALL-E returned the following images. We note that because this feature relies on high-quality training data, there may be certain words that will distort the result of the end product if DALL-E was not trained in those words.

While not even this fortune-telling Shiba Inu can tell us when artificial general intelligence (AGI) will be widely used, according to OpenAI's employees, half the lab bets it is likely to happen within 15 years.

Exhibit 1: DALL-E Test – “A Fortune-telling Shiba Inu Reading Your Fate In A Giant Hamburger, Digital Art”



Source: OpenAI's DALL-E-2 and CIBC World Markets Inc.

Our Experience With OpenAI's 'Playground' Platform

We tested OpenAI's Playground to generate a blog post on a specific topic. We were able to adjust the model's likelihood of talking about different topics related to the search, penalizing new tokens based on their existing frequencies in the text, etc., to continually improve the output. When searching “**Big Tech Races To Invest In Metaverse,**” Playground returned the following blog.

Virtual and augmented reality technology becomes more sophisticated, as a growing number of tech giants are vying for a slice of the metaverse pie. Companies like Google, Facebook, Apple, Microsoft, and Amazon are all investing heavily in virtual reality and augmented reality technology, and are all working on their own versions of a metaverse. The metaverse is a digital world that is immersive and interactive, and it has the potential to revolutionize the way we interact with the internet, work, and play. While the concept of a metaverse is still in its early stages, there is a lot of excitement around the potential of this technology, and these big tech companies are racing to be the first to bring a metaverse to the masses.

Facebook's Oculus Rift is one of the most popular virtual reality headsets on the market. Google is working on a project called Daydream that is a platform for virtual reality content. Apple is rumored to be working on a secret project called Tango that is believed to be an augmented reality platform. Microsoft is working on a mixed reality platform called HoloLens. Amazon is working on a project called Amazon Lumberyard that is a game engine for developing 3D games. These are just a few of the many examples of the big tech companies that are investing in the metaverse. It is clear that the race is on to be the first to bring this technology to the masses, and it will be interesting to see who comes out on top.

The text above was generated using Open AI's Playground.

News Impacting Our Coverage

Research Highlight: CGI – M&A Ramping Up; Takeaways From Our Tech Tour

CIBC recently hosted an in-person investor Tech Tour of Montreal's leading companies. Our tour included a stop at CGI's Innovation Centre, where we met senior management, including Jean-Michel Baticle (COO), Francois Boulanger (CFO), Julie Godin (EVP Strategic Planning and Corporate Development) and Mike Keating (SVP Mergers and Acquisitions). This stop followed a fireside chat with George Schindler (CEO) at CIBC's 21st Eastern Institutional Investor Conference. These events confirmed our view that CGI is well positioned to execute on M&A as the valuation environment changes in its favor, with a special interest in transformational deals. [Link To Note](#)

Research Highlight: ESG In Canadian Tech 2022

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 we expect these risks to lessen over time as pre-IPO shareholders gradually reduce their stakes in the businesses.

[Link To Note](#)

Research Highlight: DND – FQ4 Results Stable; NCIB Initiated

DND reported encouraging FQ4 results despite concerns around a cooling housing market and the potential distraction of the lengthy, and ultimately unsuccessful, Link Group process. DND reiterated F2023 guidance of an excess of \$350 million in adjusted EBITDA despite housing market weakness and the pending sale of TM Group. The company also announced its NCIB, providing authorization to buy back 5% of the outstanding shares in the public market starting September 30, 2022. [Link To Note](#)

Kinaxis Publishes Its 2022 Global Impact Report

Key highlights from the report include the following:

- Achieved carbon neutrality for Scope 1 through 3 GHG emissions for the third consecutive year in 2021.
- Of the Kinaxis team, 92% believe that leadership is committed to diversity, equity and inclusion.
- Initial disclosures under the Task Force on Climate-related Financial Data (TCFD) framework, to bring transparency around climate risks into the company's reporting.
- The annual employee engagement survey revealed an 87% overall engagement score, and showed that 90% of team members would recommend Kinaxis to a good friend.

More on the report here: [Link To Report](#)

ULTA Beauty Taking Steps To Modernize Its Workforce With OpenText Solutions

ULTA Beauty will discuss digitization of the workforce in an opening Keynote with CEO & CTO Mark J. Barrenechea at this year's Open Text World 2022 conference taking place October 4-6 in Las Vegas.

Converge Announces IBM zSystems And LinuxONE Certification In Canada

CTS is now certified to sell and implement IBM zSystems and LinuxONE in Canada. IBM zSystems is an overarching title used by IBM for all of its z/Architecture mainframe computers. The company has been offering these solutions to its clients across the U.S. for many years and has strong expertise around these offerings.

OpenText And Solarity To Collaborate On Providing Healthcare Data

The partnership will bring together Solarity's automation platform for clinical data and OpenText's suite of digital fax products to enable physicians to make faster informed clinical decisions.

Constellation Acquires Neosoft

Aquila Software, a Constellation subsidiary, acquired Neosoft for an undisclosed amount. The acquisition enhances Aquila's product offerings and develops new opportunities. Based out of Santiago, Chile Neosoft provides regulatory reporting and compliance management services.

Exhibit 2: CIBC Software/Services – Coverage Performance, 9/28/2021 - 9/28/2022

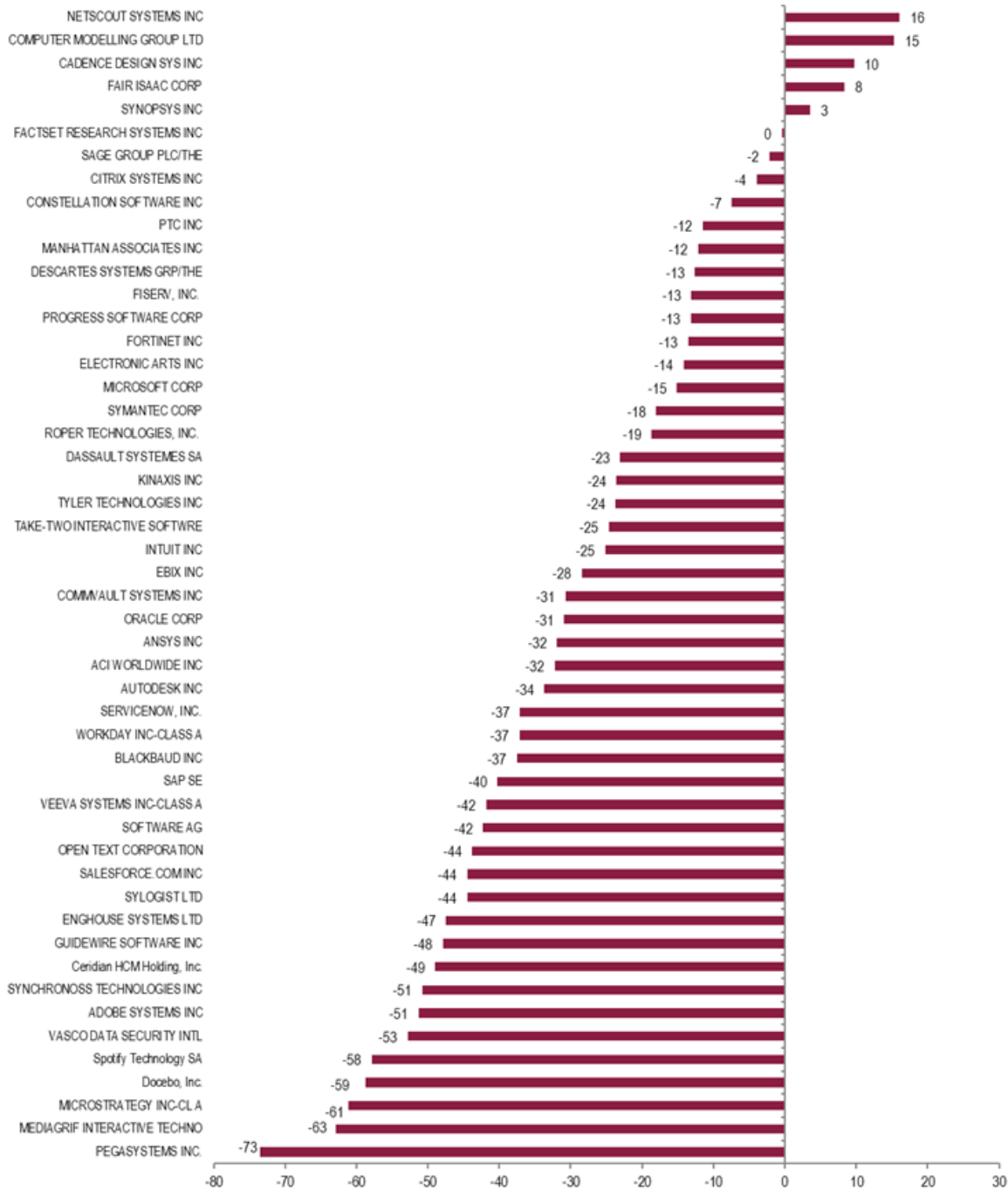
Software & Systems	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD	52W High	52W Low
Constellation Software Inc	1,922.99	0.4	(5.5)	0.2	(10.6)	(7.4)	(18.1)	2385.80	1793.93
Descartes Systems	65.23	(1.9)	(5.8)	5.1	(14.5)	(18.2)	(21.1)	91.39	56.19
Enghouse Systems Limited	28.95	(0.5)	(9.2)	0.5	(27.6)	(47.4)	(40.2)	61.45	23.96
Open Text Corp	27.56	(1.1)	(12.8)	(27.7)	(36.9)	(43.8)	(42.0)	52.70	26.40
Kinaxis	139.19	0.9	(9.3)	1.1	(16.5)	(23.6)	(21.5)	229.98	119.48
Docebo, Inc.	38.12	2.0	1.2	2.6	(41.9)	(58.7)	(55.1)	102.93	32.35
Magnet Forensics	21.60	0.7	(12.4)	25.6	(24.0)	(50.7)	(34.3)	47.00	14.89
Q4 Inc.	4.20	(3.9)	(6.7)	(4.8)	(16.0)	NA	(50.6)	12.05	4.01
Average		(0.4)	(7.5)	0.3	(23.5)	(35.7)	(35.4)		

Business Services	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD	52W High	52W Low
CGI Group Inc	105.04	2.9	0.7	2.6	3.7	(4.2)	(6.1)	116.00	95.45
Converge Technologies	6.75	12.7	18.2	27.4	(35.0)	(34.1)	(37.9)	12.80	4.85
Softchoice Corporation	20.48	0.7	8.1	(2.7)	(25.0)	(30.7)	(4.1)	30.39	17.48
Telus International	38.56	2.0	0.7	18.7	19.9	(13.6)	(7.8)	49.43	26.75
Average		4.5	6.9	11.5	(9.1)	(20.6)	(14.0)		

Indices	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD
S&P/TSX Composite Index	18,648.92	(1.9)	(6.0)	(2.3)	(15.6)	(7.5)	(12.1)
S&P 500 Index	3,719.04	(1.0)	(7.7)	(2.6)	(19.7)	(14.7)	(22.0)
S&P/TSX Software Index	125.94	2.6	(4.0)	(3.1)	(28.2)	(43.0)	(40.7)
S&P500 Software Index	4,050.98	0.1	(9.6)	(7.4)	(24.2)	(22.3)	(30.7)

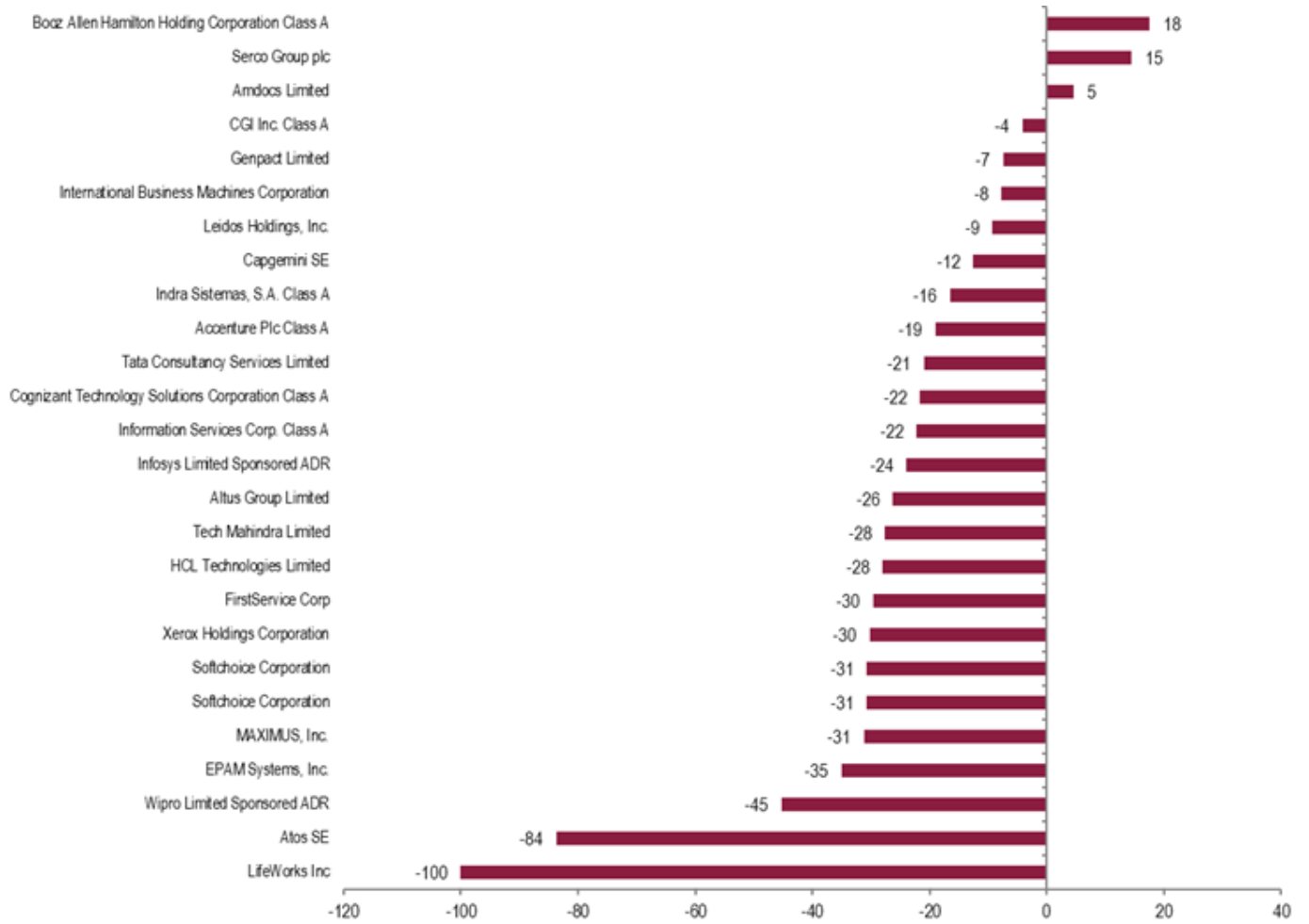
Source: FactSet and CIBC World Markets Inc.

Exhibit 3: Software Stocks – Return Performance (%), 9/28/2021 - 9/28/2022



Source: FactSet and CIBC World Markets Inc.

Exhibit 4: Business Services Stocks – Return Performance (%), 9/28/2021 - 9/28/2022



Source: FactSet and CIBC World Markets Inc.

Exhibit 5: Software Stocks – Comp Table, 2021 - 2023E

	Enterprise Value	EV/S			EV/EBITDA			P/E		
		C21	C22E	C23E	C21	C22E	C23E	C21	C22E	C23E
Enterprise Application Software										
Constellation Software Inc.*	31,193	6.1x	4.8x	4.2x	20.6x	18.3x	15.7x	45.1x	25.3x	22.8x
BlackBerry Limited*	2,778	3.1x	4.1x	2.8x	>50	NEG	NEG	NEG	NEG	NEG
Sage Group plc	7,330	4.0x	3.7x	3.5x	17.7x	15.6x	14.3x	26.5x	25.4x	22.7x
Tyler Technologies, Inc.	15,459	9.7x	8.3x	7.6x	44.0x	32.7x	30.0x	>50	46.5x	43.0x
Roper Technologies, Inc.	47,082	8.1x	9.0x	8.4x	21.3x	22.0x	20.2x	36.0x	27.3x	25.0x
Enghouse Systems Limited	1,391	3.0x	3.3x	3.34x	8.6x	10.2x	10.1x	17.3x	21.8x	21.6x
Oracle Corporation	227,599	5.6x	4.9x	4.4x	12.2x	9.7x	8.9x	13.9x	12.7x	11.7x
SAP SE	105,040	3.8x	3.4x	3.2x	14.7x	12.4x	11.0x	18.6x	17.0x	15.0x
Enterprise Application Software Average		5.4x	5.2x	4.7x	19.9x	17.3x	15.7x	26.2x	25.1x	23.1x
Extended ERP										
Adobe Incorporated	130,274	8.2x	7.3x	6.5x	19.5x	14.9x	13.3x	28.1x	20.4x	17.9x
Open Text Corporation	10,217	3.0x	2.8x	2.8x	8.0x	8.1x	7.6x	8.7x	8.8x	8.2x
Manhattan Associates, Inc.	8,185	12.3x	11.1x	10.0x	>50	42.0x	36.4x	>50	>50	>50
Pegasystems Inc.	3,100	2.6x	2.4x	2.1x	NEG	>50	26.1x	NEG	>50	41.8x
Software AG	1,418	1.7x	1.5x	1.4x	9.2x	7.1x	6.2x	20.5x	14.7x	12.2x
Fiserv, Inc.	82,648	5.1x	4.9x	4.6x	14.9x	11.5x	10.6x	48.4x	14.8x	13.0x
Extended ERP Average		5.5x	5.0x	4.6x	12.9x	16.7x	16.7x	26.4x	14.7x	18.6x
Software As A Service										
Descartes Systems Group Inc.	5,351	12.6x	10.9x	9.8x	28.9x	24.8x	22.0x	>50	>50	>50
Kinaxis, Inc.*	2,623	10.5x	7.3x	6.5x	>50	40.4x	35.9x	>50	>50	>50
Docebo, Inc.*	705	6.8x	4.9x	3.6x	NEG	NEG	>50	NEG	NEG	NEG
Lightspeed Commerce Inc*	1,914	4.1x	2.7x	2.0x	NEG	NEG	NEG	NEG	NEG	NEG
Veeva Systems Inc Class A	23,257	15.9x	11.0x	9.5x	>50	27.7x	23.9x	>50	40.0x	35.5x
Shopify, Inc. Class A	31,410	6.8x	5.7x	4.6x	>50	NEG	>50	12.8x	NEG	NEG
Q4 Inc*	79	1.4x	1.4x	1.4x	NEG	NEG	NEG	NEG	NEG	NEG
Magnet Forensics, Inc.*	535	7.6x	5.7x	4.4x	28.7x	34.8x	19.6x	>50	>50	>50
Ceridian HCM Holding, Inc.	9,636	9.4x	7.8x	6.7x	>50	44.0x	35.4x	NEG	>50	>50
ServiceNow, Inc.	77,454	13.1x	10.6x	8.6x	>50	34.1x	27.3x	>50	>50	42.1x
Workday, Inc. Class A	38,606	9.0x	6.3x	5.3x	>50	24.7x	20.2x	NEG	45.7x	36.1x
Software As A Service Average		8.8x	6.8x	5.7x	28.8x	32.9x	26.3x	12.8x	42.8x	37.9x
Infrastructure Vendors										
Citrix Systems, Inc.	16,200	5.0x	4.9x	4.8x	23.0x	13.2x	13.1x	42.6x	>50	32.6x
Microsoft Corporation	1,771,517	10.5x	8.5x	7.6x	21.9x	17.0x	15.1x	29.9x	24.9x	21.8x
Infrastructure Vendors Average		7.8x	6.7x	6.2x	22.5x	15.1x	14.1x	36.3x	24.9x	27.2x
Software Average		7.0x	5.9x	5.2x	19.5x	22.2x	19.2x	26.8x	24.7x	24.9x

*Share Price Converted to USD

Source: FactSet and CIBC World Markets Inc.

Exhibit 6: Business Services Stocks – Comp Table, 2021 - 2023E

	Enterprise Value (\$mlns.)	EV/EBITDA			P/E			EV/S		
		C21	C22E	C23E	C21	C22E	C23E	C21	C22E	C23E
Business & IT Services										
CGI Inc. Class A	28,133	11.4x	10.9x	10.4x	18.8x	17.0x	16.0x	2.3x	2.2x	2.1x
TELUS International (CDA), Inc.	8,470	15.7x	13.6x	11.6x	28.0x	23.6x	18.7x	3.9x	3.3x	2.9x
Accenture Plc Class A	161,115	16.8x	13.9x	13.1x	28.6x	23.9x	22.1x	3.2x	2.6x	2.4x
Booz Allen Hamilton	14,771	16.6x	15.3x	14.4x	21.4x	21.6x	19.7x	1.9x	1.7x	1.6x
CACI International Inc Class A	8,267	11.1x	12.4x	11.5x	14.6x	14.8x	13.9x	1.4x	1.3x	1.2x
DXC Technology Co.	9,031	4.5x	3.7x	3.7x	NEG	6.8x	5.6x	0.5x	0.6x	0.6x
Genpact Limited	9,251	14.3x	11.8x	10.5x	23.2x	16.3x	14.5x	2.3x	2.1x	1.9x
International Business Machines	158,457	11.8x	10.1x	9.6x	19.3x	13.2x	12.3x	2.8x	2.6x	2.6x
Atos SE	2,594	2.5x	2.6x	2.4x	NEG	6.7x	4.0x	0.2x	0.2x	0.2x
Capgemini SE	32,651	11.3x	9.3x	8.6x	23.8x	15.0x	13.4x	1.8x	1.5x	1.4x
Sopra Steria Group SA	3,833	7.3x	6.3x	5.8x	13.7x	9.1x	8.5x	0.8x	0.8x	0.7x
Converge Technology Solutions C	1,454	15.5x	9.8x	7.8x	>50	41.1x	22.5x	1.0x	0.6x	0.5x
Business & IT Services Average		11.2x	10.0x	9.2x	21.3x	15.3x	13.5x	1.9x	1.7x	1.6x
HR Outsourcing										
		EV/EBITDA			P/E			EV/S		
Ceridian HCM Holding, Inc.	9,636	>50	44.0x	35.4x	NEG	>50	>50	9.4x	7.8x	6.7x
Willis Towers Watson	23,432	10.5x	9.9x	9.1x	6.3x	15.2x	13.2x	2.6x	2.6x	2.5x
Aon Plc Class A	67,648	17.7x	16.8x	15.7x	49.6x	20.9x	18.9x	5.5x	5.3x	5.1x
Automatic Data Processing, Inc.	98,487	25.7x	21.6x	19.4x	38.2x	30.9x	27.4x	6.6x	5.7x	5.3x
Paychex, Inc.	41,878	25.3x	19.5x	18.2x	38.7x	29.3x	27.1x	10.3x	8.7x	8.1x
HR Outsourcing Average		19.8x	22.4x	19.6x	33.2x	24.1x	21.7x	6.9x	6.0x	5.5x
Information Services										
		EV/EBITDA			P/E			EV/S		
Broadridge Financial Solutions, Inc.	21,306	18.3x	16.3x	15.2x	32.0x	22.0x	20.3x	4.2x	3.6x	3.4x
Dye & Durham Ltd.	2,035	12.8x	12.8x	9.0x	>50	>50	25.2x	5.4x	3.6x	3.1x
Deluxe Corporation	2,217	6.0x	5.3x	5.2x	12.1x	4.4x	4.1x	1.1x	1.0x	1.0x
Information Services Corp	394	5.8x	6.1x	6.0x	10.6x	10.5x	11.0x	2.3x	2.1x	2.0x
Information Services Average		10.7x	10.1x	8.8x	18.3x	12.3x	15.2x	3.2x	2.6x	2.4x
Financial Services Technology										
		EV/EBITDA			P/E			EV/S		
Fidelity National Information Services	65,864	10.8x	10.1x	9.3x	>50	10.9x	9.9x	4.7x	4.5x	4.2x
Fiserv, Inc.	82,648	14.9x	11.5x	10.6x	48.4x	14.8x	13.0x	5.1x	4.9x	4.6x
Jack Henry & Associates, Inc.	13,645	19.6x	21.6x	19.9x	44.9x	36.8x	34.4x	7.8x	6.8x	6.3x
ACI Worldwide, Inc.	3,408	9.3x	8.5x	7.8x	19.5x	15.7x	13.4x	2.5x	2.4x	2.3x
Temenos AG	5,732	10.5x	12.0x	10.9x	27.4x	16.4x	14.6x	5.9x	5.5x	5.1x
Global Payments Inc.	41,199	11.3x	10.5x	9.5x	33.7x	11.7x	10.2x	4.8x	5.1x	4.7x
Financial Services Technology Average		12.7x	12.4x	11.3x	34.8x	17.7x	15.9x	5.1x	4.9x	4.5x
Diversified Real Estate Services										
		EV/EBITDA			P/E			EV/S		
Colliers International Group Inc.	4,969	9.1x	7.6x	6.7x	-10.5x	12.5x	11.5x	1.2x	1.1x	1.0x
Altus Group Limited	2,207	21.3x	20.8x	17.5x	31.0x	31.0x	32.7x	3.5x	3.5x	3.1x
CBRE Group, Inc. Class A	24,309	11.4x	7.8x	7.7x	13.0x	11.4x	11.3x	0.9x	0.8x	0.7x
Jones Lang LaSalle Incorporated	9,295	6.4x	6.4x	6.3x	8.4x	8.1x	7.7x	0.5x	0.4x	0.4x
Diversified Real Estate Services Average		12.0x	10.7x	9.6x	10.5x	15.7x	15.8x	1.5x	1.5x	1.3x
Software Focused IT Solutions/VARs										
		EV/EBITDA			P/E			EV/S*		
Softchoice Corporation* USD	965	39.5x	11.6x	9.5x	NEG	21.1x	16.1x	3.6x	3.0x	2.7x
Softcat Plc*	2,191	13.0x	14.5x	13.8x	17.5x	19.9x	19.6x	5.9x	6.2x	5.6x
Crayon Group Holding ASA*	8,085	>50	>50	>50	>50	>50	>50	>50	21.0x	17.8x
Bytes Technology Group Plc*	894	18.4x	15.5x	14.1x	36.6x	21.9x	21.1x	NA	NA	NA
SoftwareONE Holding Ltd.*	1,123	6.8x	4.8x	4.2x	12.2x	12.3x	11.2x	5.4x	1.1x	1.0x
Bytes Technology Group Plc* Average		19.4x	11.6x	10.4x	22.1x	18.8x	17.0x	5.0x	7.8x	6.8x
Business Services Average		13.6x	12.5x	11.3x	23.6x	17.1x	15.8x	3.6x	3.7x	3.4x

*Software Focused IT Solutions/VARs uses EV/GP metric.

Source: FactSet and CIBC World Markets Inc.

Exhibit 7: SaaS Stocks – Comp Table, 2021 - 2023E

	LTM Revenue Growth	LTM FCF Margin	NTM Revenue Growth	NTM FCF Margin	LTM Rule Of 40	NTM Rule Of 40	Enterprise Value (\$MM)	EV/S		
								C21	C22E	C23E
Tier 1 SaaS (Rule of 40 > 60)										
Zoom Video Communications	18%	31%	6%	27%	49%	33%	17,265	6.5x	3.9x	3.9x
CrowdStrike Holdings, Inc.	61%	30%	43%	29%	91%	72%	37,811	43.2x	17.5x	17.5x
Shopify, Inc.	30%	1%	21%	-9%	31%	12%	30,578	6.6x	5.6x	5.6x
Zscaler, Inc.	61%	22%	41%	22%	83%	63%	23,459	34.9x	18.6x	18.6x
Lightspeed POS, Inc.	101%	-19%	33%	-5%	82%	28%	1,877	8.5x	2.7x	2.7x
DocuSign, Inc.	37%	24%	14%	16%	61%	30%	11,184	7.7x	4.6x	4.6x
Veeva Systems Inc	20%	38%	15%	37%	58%	53%	23,257	15.9x	11.0x	11.0x
Atlassian Corp. Plc	34%	27%	28%	22%	61%	50%	55,469	26.6x	17.3x	17.3x
Twilio, Inc.	51%	-6%	28%	-3%	45%	25%	9,349	3.3x	2.4x	2.4x
ServiceNow, Inc.	28%	31%	23%	30%	58%	53%	77,454	13.1x	10.6x	10.6x
HubSpot, Inc.	42%	16%	23%	12%	58%	35%	13,152	10.1x	7.8x	7.8x
Tier 1 SaaS (Rule of 40 > 60) Average								16.0x	9.3x	9.3x
	LTM Revenue Growth	LTM FCF Margin	NTM Revenue Growth	NTM FCF Margin	LTM Rule Of 40	NTM Rule Of 40	Enterprise Value (\$MM)	EV/S		
								C21E	C22E	C23E
Tier 2 SaaS (Rule of 40 b/w 40-60)										
Docebo, Inc.	50%	-2%	36%	-4%	48%	32%	708	6.8x	4.9x	3.6x
Qualys, Inc.	17%	40%	18%	36%	56%	55%	5,175	12.5x	10.6x	10.6x
Descartes Systems	22%	39%	10%	36%	61%	46%	5,351	12.6x	10.9x	9.8x
Avalara Inc	33%	3%	21%	3%	36%	24%	7,611	10.9x	8.8x	8.8x
Five9, Inc.	34%	-4%	23%	7%	30%	30%	5,799	9.5x	7.4x	7.4x
Dropbox, Inc.	11%	33%	6%	34%	44%	40%	8,070	3.7x	3.5x	3.5x
Wix.com Ltd.	16%	-1%	8%	4%	15%	12%	4,135	3.3x	3.0x	3.0x
Workday, Inc.	22%	21%	19%	20%	43%	39%	38,606	9.0x	6.3x	6.3x
VMware, Inc.	7%	24%	7%	29%	31%	35%	56,314	4.8x	4.2x	4.2x
Tier 2 SaaS (Rule of 40 b/w 40-60) Average								8.1x	6.6x	6.4x
	LTM Revenue Growth	LTM FCF Margin	NTM Revenue Growth	NTM FCF Margin	LTM Rule Of 40	NTM Rule Of 40	Enterprise Value (\$MM)	EV/S		
								C21E	C22E	C23E
Tier 3 SaaS (Rule of 40 b/w 28-40)										
BlackLine, Inc.	22%	8%	22%	6%	30%	28%	3,538	8.3x	6.7x	6.7x
Zendesk, Inc.	30%	12%	21%	14%	42%	35%	9,632	7.2x	5.7x	5.7x
MongoDB, Inc.	54%	-2%	25%	2%	52%	27%	13,242	22.4x	11.2x	11.2x
LivePerson, Inc.	19%	-27%	5%	-4%	-8%	1%	811	1.7x	1.6x	1.6x
Rapid7 Inc.	33%	5%	23%	11%	38%	35%	3,313	6.2x	4.8x	4.8x
Paylocity Holding Corp.	34%	16%	28%	15%	50%	43%	13,838	21.8x	14.2x	14.2x
Q2 Holdings, Inc.	18%	0%	18%	3%	18%	21%	2,093	4.2x	3.6x	3.6x
Akamai Technologies, Inc.	7%	24%	3%	21%	31%	24%	14,855	4.3x	4.1x	4.1x
Tier 3 SaaS (Rule of 40 b/w 28-40) Average								9.5x	6.5x	6.5x
	LTM Revenue Growth	LTM FCF Margin	NTM Revenue Growth	NTM FCF Margin	LTM Rule Of 40	NTM Rule Of 40	Enterprise Value (\$MM)	EV/S		
								C21E	C22E	C23E
Tier 4 SaaS (Rule of 40 <28)										
RingCentral, Inc.	33%	8%	22%	9%	40%	30%	5,265	3.3x	2.6x	2.6x
Teradata Corporation	-3%	19%	-3%	23%	16%	20%	3,221	1.7x	1.8x	1.8x
Zuora, Inc.	15%	4%	13%	0%	19%	13%	847	2.8x	2.2x	2.2x
New Relic, Inc.	20%	3%	17%	1%	23%	18%	3,485	5.2x	3.9x	3.9x
Kinaxis, Inc.	35%	7%	23%	9%	42%	32%	2,623	10.5x	7.3x	6.5x
Yext, Inc.	10%	1%	2%	-1%	11%	1%	443	1.2x	1.1x	1.1x
Splunk Inc.	26%	7%	21%	14%	33%	35%	15,042	6.7x	4.5x	4.5x
Tier 4 SaaS (Rule of 40 <28) Average								4.5x	3.3x	3.2x
SaaS Average								10.2x	6.8x	6.7x

Source: FactSet and CIBC World Markets Inc.

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