

EQUITY RESEARCH

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Industry Update

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AI Frenzy – Bits & Bytes Weekly

Generative AI: Risk Or Opportunity?

Our Conclusion

Although not an entirely new technology, artificial intelligence has been taking the world by storm in the last few weeks, mainly driven by the extreme rise in popularity of generative AI technologies such as ChatGPT, which is now the fastest growing consumer app, reaching 100 million users only two months after its launch according to news reports. The increasing use of generative AI technologies is creating waves in the market, with companies either indicating that AI advances such as ChatGPT are beginning to impact growth (see: Chegg) or announcing their own development and incorporation of existing AI technologies into their business models (see: Google, Microsoft, IBM). While the impact of generative AI on company performance is still unknown, one thing is for certain – we can't stop talking about it.

Key Points

Is Generative AI Running Before It Can Walk? While not new, generative AI is still in its early days. Over the past few weeks, we've seen what could only be described as a generative AI frenzy, driven by the release of AI tools such as ChatGPT-4 to the general public and the tech giants' race to claim their share of the market. Both the usefulness and accuracy of technologies such as ChatGPT have received mixed reviews, ranging from IBM's stance that ChatGPT is "not ready for primetime" and Geoffrey Hinton's fears of its ability to spread misinformation, to other industry reports estimating generative AI could raise global GDP by 7%.

Despite the continuing debate around accuracy and speed of adoption of these technologies, generative AI shows no signs of slowing down. The tech giants are investing billions of dollars in the technology, and AI-based start-ups continue to raise cash. According to Bloomberg, there have been 1,072 mentions of AI on earnings calls so far this quarter.

Stock Market Divided: It seems the market is divided on whether AI will provide opportunity through increased productivity, or ultimately capsize companies through automation. Chegg, an online education company, recently reported ChatGPT's prevalence was pressuring subscriber growth, prompting the company to suspend its full-year outlook and sending shares tumbling by >40%. Although Chegg announced plans to develop its own AI tool, the sharp share price decline appears to indicate Chegg is already too far behind in the AI race. Investor fears quickly spread to other digital education companies, with Duolingo dropping 10% and Pearson down 15% the same day. On the other hand, shares of companies that have reported the incorporation of AI into their business models have performed relatively well YTD, as can be seen by the upward movements in Meta, Google, and Microsoft after their Q1/23 results where each company heavily focused on their respective AI integration strategies.

All figures in US dollars unless otherwise stated.

For required regulatory disclosures please refer to "Important Disclosures" beginning on page 10.

Sector:

Information Technology

We Can't Stop Talking About Generative AI

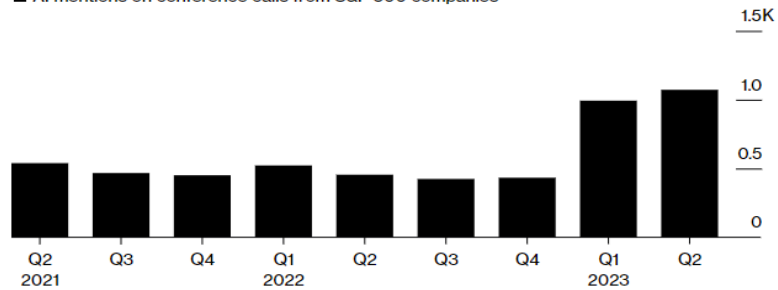
According to an article published by Bloomberg on May 5, references to AI and related terms in quarterly earnings calls (of companies in the S&P 500) clocked 1,072 mentions as of the date of the article, an increase of more than 50% from a year ago. Mentions ranged from AI investments, to leveraging AI in order to increase productivity, visibility, and enhance performance, and to the integration of generative AI (most frequently ChatGPT) into company business models. IBM even went as far as stating it will pause hiring for jobs that could be done by AI. The company predicts some 30% of its 26,000 customer-facing roles could be replaced by AI and automation. That amounts to ~7,800 jobs being eliminated.

Exhibit 1: Bloomberg – Analysis Of Artificial Intelligence Mentions On Earnings Calls Q1/23

Artificial Intelligence Mentions on Earnings Calls Surge

Comments this quarter have already surpassed previous results

■ AI mentions on conference calls from S&P 500 companies

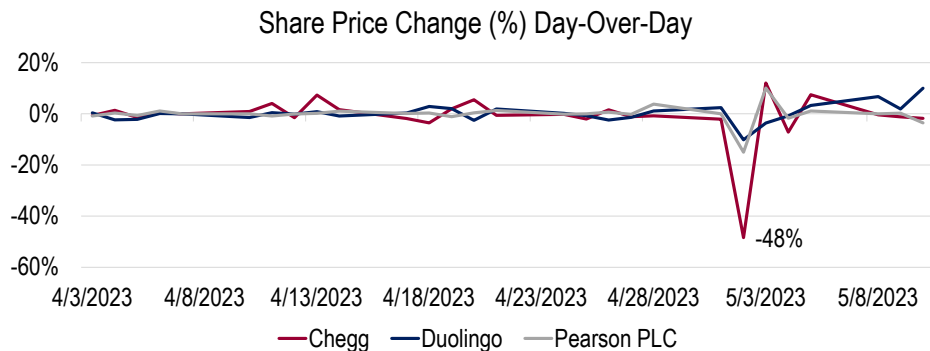


Source: Bloomberg News analysis of earnings transcripts
 Note: Analysis looked at the phrase "AI" and related synonyms. Data through May 4, with roughly 20 percent of S&P 500 companies still to report.

Source: Bloomberg.

Its not all positive news, however. The most notable example of ChatGPT's negative impact is the recent performance of Chegg, a U.S.-based learning platform for students, most well know for providing online tutoring and online homework help to students. During the company's earnings call on May 1, CEO Dan Rosensweig stated that the company saw "a significant spike in student interest in ChatGPT" before stating that the company now believes ChatGPT is having a negative impact on new customer growth. As a result, Chegg suspended its full-year outlook, sending shares of the company tumbling by ~47% on Tuesday morning. The update was also followed by analyst price target cuts and downgrades, citing fears that Chegg's core business could become extinct. Chegg is continuing to press on, announcing the development of its own AI product "CheggMate" built in collaboration with OpenAI; however, the share price reaction appears to indicate Chegg is too late. Investor fears of obsolescence quickly spread to other education-based companies, with shares of Duolingo dropping 10% and Pearson down 15% the same day.

Exhibit 2: Share Price Performance, April 2023 - Present



Source: FactSet and CIBC World Markets Inc.

News Impacting Our Coverage

Research Highlight: CSU - [2022 Virtual AGM Takeaways](#)

Constellation hosted a virtual AGM on May 8 that included a question-and-answer session with the head office team and the heads of CSU's operating groups. As usual, we picked up some interesting tidbits from the AGM, including additional details around the WideOrbit investment rationale, the restructuring of Altera (which has been split into 11 business units) and the use of carve-outs as a differentiator in larger deals. We continue to see Constellation as attractive here, trading slightly below its five-year average EV/EBITDA valuation despite a significant acceleration in its capital deployment and the potential for future value-accretive spin-outs. We retained our Outperformer rating and C\$3,000 price target.

Research Highlight: CTS - [A Focus On Integration & Organic Growth](#)

With the strategic review completed and Converge returning to business as usual, the company has recommitted to focusing on organic growth and M&A integration. We have made few changes to our model post earnings, with our F2023 forecast already incorporating slowing organic growth amid a weakening IT demand environment and margins that are roughly flat Y/Y as Converge reinvests the proceeds from cost-savings initiatives into its Services business. We retained our Neutral rating and reduced our price target to \$3.00 (prior \$5.25) to reflect our view of the floor value of the stock. We see upside if Converge is able to execute on its organic growth and integration activities more quickly than anticipated.

Research Highlight: DCBO - [Cost Optimization To Further Drive Profitability](#)

Docebo is taking steps to grow and operate efficiently amid a challenging macro backdrop. The company posted a solid Q1, with adj. EBITDA margins 70 bps ahead of expectations as Docebo continues to focus on profitability. Despite solid headline numbers, incremental ARR and customer adds were lower than expected. The Q2 revenue guide was also ~3% below consensus at the mid-point, which appears driven by lower professional services revenue. With Q1, Docebo announced a ~5% headcount reduction and appears on track to achieving its goal of double-digit EBITDA margins by the end of 2023. We retained our Outperformer rating and reduced our price target to C\$68 (prior C\$69.50) given our revised revenue forecast.

Kinaxis And Exiger Partnership

Kinaxis announced a strategic partnership with Exiger, a SaaS company focused on providing supply chain risk management solutions to corporations, banks and government agencies. Exiger will join the Kinaxis ecosystem as a solutions extension partner under Kinaxis PartnerLink. The partnership will bring together Exiger's AI with Kinaxis' RapidResponse platform to improve visibility, automate assessments of supplier, provide mitigation recommendations and deploy plans in real time.

Q4 And Novisto Partner

Q4 announced a collaboration with Novisto, a leading ESG data management software company which will allow companies to build their ESG narrative to be delivered through Q4's platform. Q4 already provides a suite of ESG communication solutions including ESG websites that standardize digital communication and expects Novisto's ESG data management platform to further enhance ESG offerings.

TELUS International Expands Global Operations To Africa

Telus International announced that it has established operations in South Africa and Morocco, now operating in 32 countries located across five continents. The expansion into Africa is a continued advancement of the company's growth strategy.

Eithad Cargo Enhances Air Shipment Visibility Using Combined Solution From Descartes & Jettainer

Descartes announced that Eithad Cargo, the cargo and logistics division of Eithad Airways has further automated air cargo processes using Descartes IoT Bluetooth Low Energy solution in combination with Jettainer’s unit load device (ULD) management services. Eithad Cargo expects to reduce the number of lost ULD by being able to tell their last known location, as well as reduce time and effort spend on stock take. Descartes’s IoT Bluetooth Low Energy ULD provides access to real time location, shipment level condition data, such as temperature, light humidity and movement and chain of custody details.

Kinaxis Named Leader In 2023 Gartner Magic Quadrant

Kinaxis announced the company was positioned further on the Completeness of Vision axis as well as the highest on Ability to Execute axis on the 2023 Gartner Magic Quadrant for Supply Chain Planning Solutions, of 20 vendors evaluated.

Exhibit 3: CIBC Coverage – Price Returns, For The Period Ending May 11, 2023

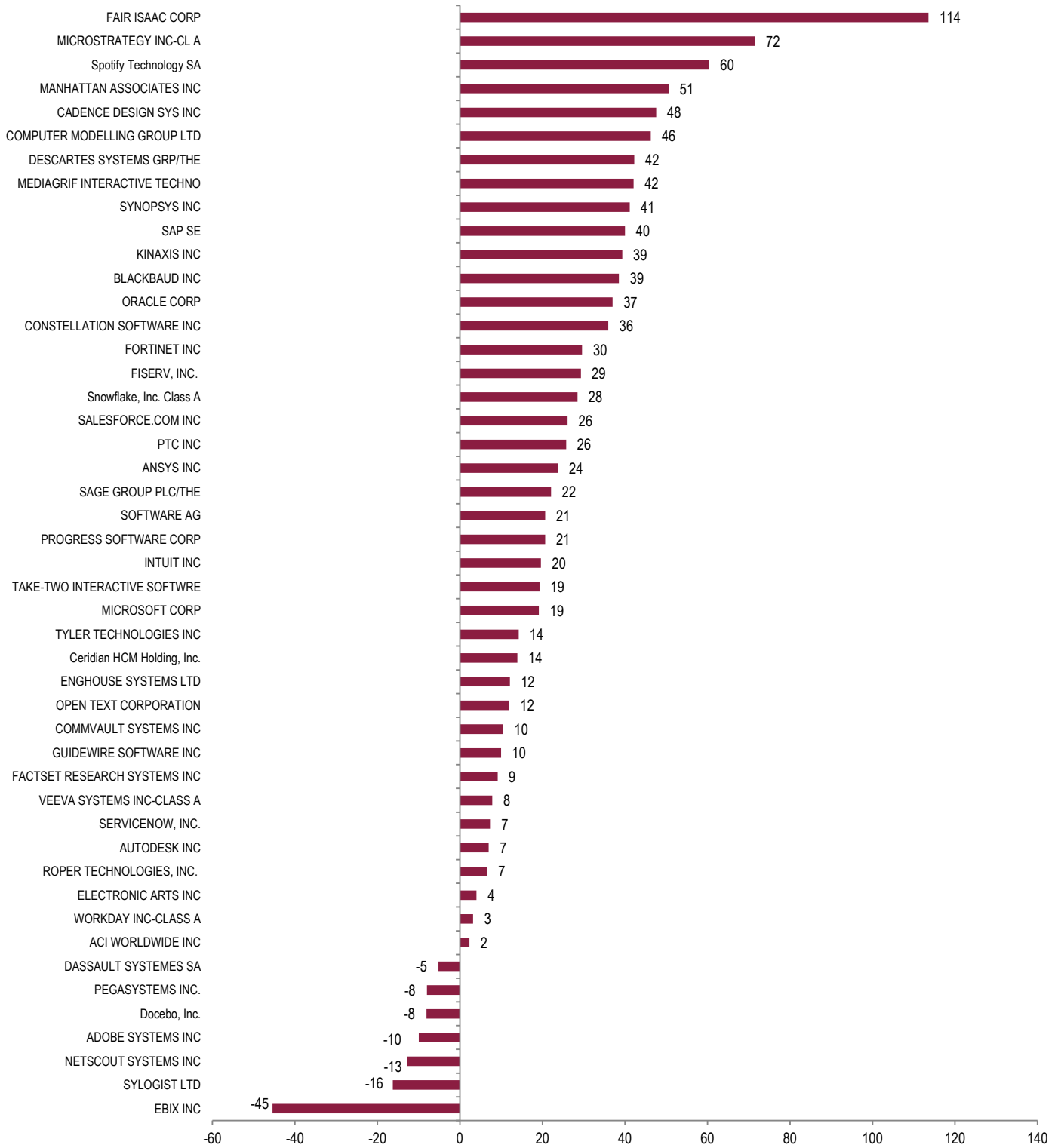
Software & Systems	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD	52W High	52W Low
Constellation Software Inc	2,577.35	(1.6)	(1.9)	11.0	31.8	36.0	24.4	2782.56	1747.83
Descartes Systems	78.38	4.8	(2.4)	5.9	8.3	36.9	12.5	82.02	56.27
Enghouse Systems Limited	35.66	(3.8)	(8.1)	(14.6)	14.3	12.1	(0.9)	44.59	23.96
Open Text Corp	40.24	10.4	4.0	14.0	34.4	11.9	35.8	42.35	24.91
Kinaxis	181.41	3.8	(0.3)	12.5	16.2	39.3	19.4	190.31	119.48
Docebo, Inc.	40.83	(3.0)	(21.8)	(18.3)	0.2	(8.1)	(8.8)	55.72	31.66
Dye & Durham	17.62	17.3	5.1	(16.6)	35.9	33.7	7.4	24.68	11.62
Altus Group	40.98	(19.5)	(28.1)	(30.3)	(24.8)	(7.5)	(24.2)	61.60	41.27
Q4 Inc.	3.24	(11.4)	(14.7)	28.6	7.3	NA	0.9	5.04	1.88
Average		(0.3)	(7.6)	(0.9)	13.7	19.3	7.4		

Business Services	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD	52W High	52W Low
CGI Group Inc	138.21	2.9	4.8	11.6	22.0	36.6	18.4	140.41	95.45
Converge Technologies	3.33	4.7	(16.5)	(38.1)	(28.7)	(50.4)	(27.5)	8.07	2.59
Information Services Corp	21.59	(1.9)	(4.6)	(0.0)	(4.2)	7.9	(10.7)	25.36	19.12
Softchoice Corporation	17.52	9.6	(9.7)	5.1	(1.2)	(19.6)	(4.1)	25.56	13.57
Telus International	23.17	(7.4)	(14.2)	(20.4)	(12.2)	(17.0)	(13.3)	40.55	22.81
Average		2.5	(8.9)	(10.4)	(5.0)	(12.6)	(6.6)		

Indices	Price	1 Week	1 Month	3 Month	6 Month	1 Year	YTD
S&P/TSX Composite Index	20,405.38	0.8	(0.1)	(1.0)	1.5	2.9	5.3
S&P 500 Index	4,127.14	1.6	0.4	0.9	3.4	4.9	7.5
S&P/TSX Software Index	184.35	5.0	10.4	15.3	32.9	46.0	35.2
S&P500 Software Index	5,119.83	1.9	6.0	12.9	20.1	18.3	25.0

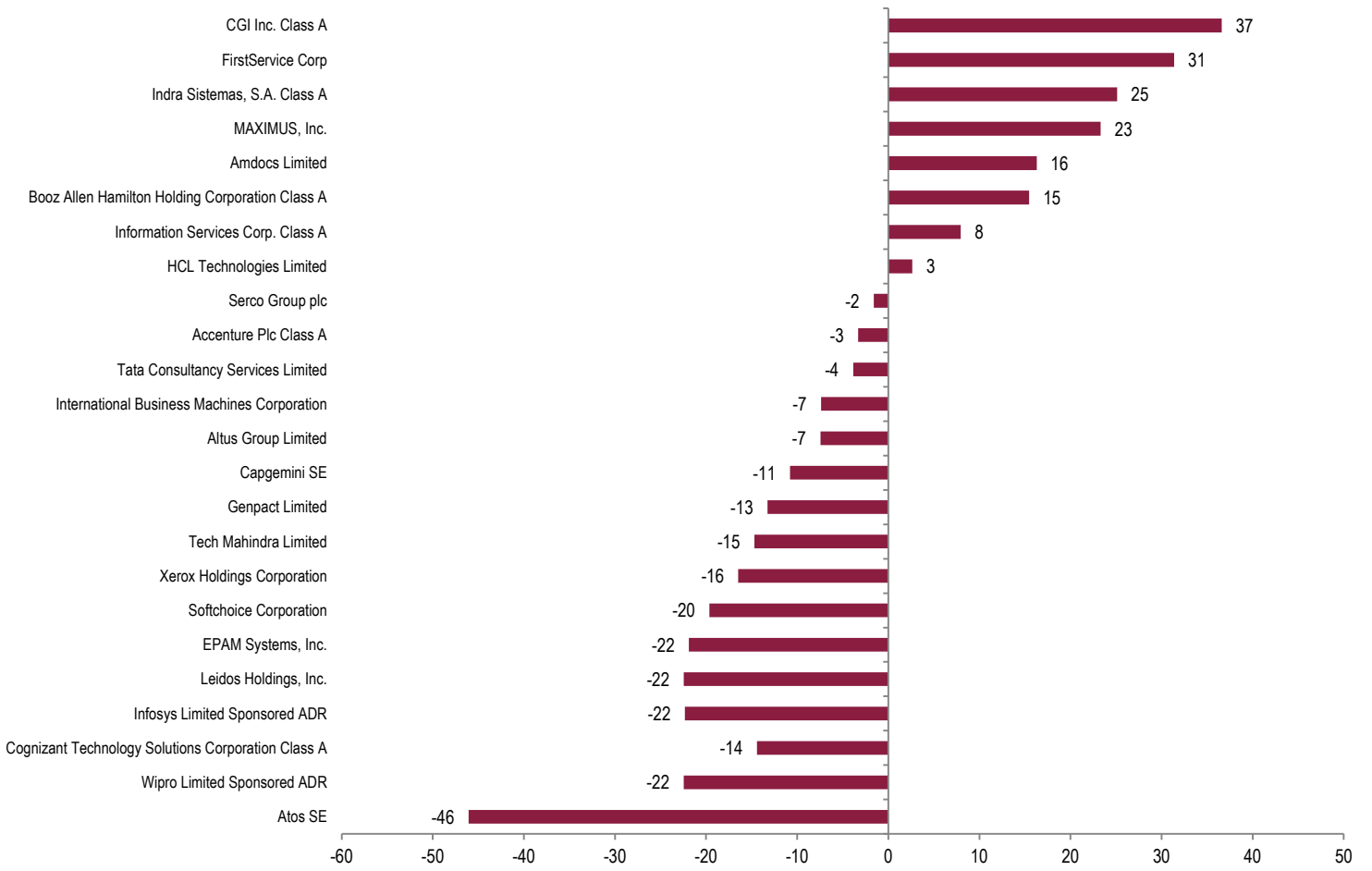
Source: Company reports, FactSet and CIBC World Markets Inc.

Exhibit 4: Software Stocks – Return Performance (%), 5/11/2022–5/11/2023



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

Exhibit 5: Business Services Stocks – Return Performance (%), 5/11/2022–5/11/2023



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

Exhibit 6: Software Stocks – Comp Table, 2022–2024E

	Enterprise Value (\$mlns.)	EV/S			EV/EBITDA			P/E		
		C22	C23E	C24E	C22	C23E	C24E	C22	C23E	C24E
Enterprise Application Software										
Constellation Software Inc.*	42,215	6.4x	5.4x	4.8x	24.8x	21.0x	18.6x	33.8x	31.2x	27.3x
BlackBerry Limited*	3,020	4.5x	3.3x	2.9x	NEG	NEG	>50	NEG	NEG	NEG
Sage Group plc	9,104	4.6x	4.2x	3.9x	19.9x	17.7x	16.1x	30.8x	26.6x	23.8x
Tyler Technologies, Inc.	17,142	9.3x	8.8x	8.0x	36.1x	35.7x	32.0x	>50	>50	44.9x
Roper Technologies, Inc.	54,870	10.2x	9.1x	8.6x	25.1x	22.5x	21.0x	32.1x	28.1x	26.1x
Enghouse Systems Limited	1,738	4.1x	4.02x	3.96x	12.6x	12.9x	11.93x	18.0x	27.9x	24.73x
Oracle Corporation	320,248	6.8x	6.2x	5.7x	13.6x	12.2x	11.1x	19.5x	18.2x	16.2x
SAP SE	153,632	4.6x	4.9x	4.5x	19.4x	16.9x	14.8x	30.0x	23.5x	19.9x
Enterprise Application Software Average		6.3x	5.7x	5.3x	21.6x	19.9x	17.9x	27.4x	25.9x	26.1x
Extended ERP										
Adobe Incorporated	155,156	8.7x	8.0x	7.1x	17.8x	16.4x	14.8x	24.6x	21.8x	19.2x
Open Text Corporation	18,941	5.4x	3.4x	3.1x	15.2x	11.5x	8.1x	12.7x	15.7x	7.5x
Manhattan Associates, Inc.	10,393	13.5x	12.1x	10.8x	47.5x	44.9x	39.5x	>50	>50	>50
Pegasystems Inc.	4,058	3.1x	2.9x	2.7x	>50	23.7x	16.0x	>50	31.6x	20.7x
Software AG	2,744	2.9x	2.7x	2.6x	15.4x	15.8x	13.3x	37.5x	24.3x	20.0x
Fiserv, Inc.	95,145	5.7x	5.3x	4.9x	13.1x	12.0x	11.1x	18.4x	16.2x	14.3x
Extended ERP Average		6.5x	5.7x	5.2x	21.8x	20.7x	17.1x	23.3x	21.9x	16.3x
Software As A Service										
Descartes Systems Group Inc.	6,379	13.1x	11.6x	10.5x	29.7x	26.1x	23.1x	>50	>50	>50
Kinaxis, Inc.*	3,563	9.7x	8.3x	7.0x	44.9x	>50	43.8x	>50	>50	>50
Docebo, Inc.*	792	5.5x	4.3x	3.3x	>50	>50	25.3x	>50	>50	40.7x
Lightspeed Commerce Inc*	1,411	2.1x	1.7x	1.3x	NEG	NEG	41.3x	NEG	>50	>50
Veeva Systems Inc Class A	24,539	11.5x	10.5x	8.8x	29.0x	29.6x	23.9x	40.8x	40.0x	33.5x
Shopify, Inc. Class A	76,577	13.7x	11.4x	9.6x	>50	>50	>50	>50	>50	>50
Q4 Inc*	69	1.2x	1.2x	1.1x	NEG	NEG	NEG	NEG	NEG	NEG
Ceridian HCM Holding, Inc.	9,692	7.8x	6.5x	5.6x	38.7x	26.0x	21.0x	>50	47.8x	36.4x
ServiceNow, Inc.	89,787	12.4x	10.2x	8.3x	39.3x	32.7x	26.2x	>50	47.4x	38.8x
Workday, Inc. Class A	43,381	7.1x	6.1x	5.2x	27.6x	21.7x	18.1x	48.7x	35.8x	29.1x
Software As A Service Average		8.4x	7.2x	6.1x	34.9x	27.2x	27.8x	44.7x	42.8x	35.7x
Infrastructure Vendors										
Microsoft Corporation	2,281,693	11.1x	10.2x	9.1x	22.7x	20.7x	17.9x	33.0x	30.1x	26.2x
Infrastructure Vendors Average		11.1x	10.2x	9.1x	22.7x	20.7x	17.9x	33.0x	30.1x	26.2x
Software Average										
		7.4x	6.5x	5.7x	25.9x	22.1x	21.3x	29.2x	29.1x	26.1x

*Share Price Converted to USD

Note: Bolded names are covered by CIBC World Markets Inc.

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

Exhibit 7: Business Services Stocks – Comp Table, 2022–2024E

	Enterprise Value (\$mlns.)	EV/EBITDA			P/E			EV/S		
		C22	C23E	C24E	C22	C23E	C24E	C22	C23E	C24E
Business & IT Services										
CGI Inc. Class A	35,520	14.4x	12.7x	12.3x	22.1x	19.8x	18.8x	2.7x	2.5x	2.5x
TELUS International (CDA), Inc.	5,533	9.1x	7.8x	6.8x	13.9x	13.9x	11.5x	2.2x	1.8x	1.6x
Accenture Plc Class A	175,439	15.3x	14.7x	13.5x	24.7x	22.9x	21.0x	2.8x	2.7x	2.5x
Booz Allen Hamilton	14,609	14.7x	13.8x	12.8x	20.9x	19.3x	17.4x	1.6x	1.5x	1.4x
CACI International Inc Class A	8,961	13.2x	12.2x	11.5x	16.9x	15.8x	14.3x	1.4x	1.3x	1.2x
DXC Technology Co.	8,679	3.6x	3.7x	3.8x	6.5x	5.9x	5.1x	0.6x	0.6x	0.6x
Genpact Limited	7,645	9.7x	9.1x	8.1x	13.1x	12.2x	10.9x	1.7x	1.6x	1.5x
International Business Machines	155,101	9.8x	10.4x	9.9x	13.3x	12.8x	12.1x	2.6x	2.5x	2.4x
Atos SE	3,167	3.2x	2.8x	2.7x	NEG	5.7x	4.2x	0.3x	0.3x	0.3x
Capgemini SE	33,178	9.5x	9.1x	8.4x	13.9x	14.3x	12.9x	1.5x	1.4x	1.4x
Sopra Steria Group SA	5,167	8.7x	7.6x	6.9x	14.0x	11.4x	10.0x	1.0x	0.9x	0.9x
Converge Technology Solutions Corp	1,016	7.1x	6.1x	5.7x	31.5x	20.0x	22.0x	0.5x	0.4x	0.4x
Business & IT Services Average		10.1x	9.4x	8.8x	15.9x	14.0x	12.6x	1.7x	1.6x	1.5x
HR Outsourcing										
Ceridian HCM Holding, Inc.	9,692	38.7x	26.0x	21.0x	>50	47.8x	36.4x	7.8x	6.5x	5.6x
Willis Towers Watson	28,384	11.9x	11.7x	10.5x	17.0x	15.8x	13.5x	3.2x	3.1x	2.9x
Aon Plc Class A	78,955	19.8x	18.2x	16.9x	25.0x	23.3x	20.8x	6.3x	5.9x	5.6x
Automatic Data Processing, Inc.	89,045	19.3x	17.3x	15.8x	27.7x	24.6x	22.2x	5.2x	4.8x	4.5x
Paychex, Inc.	38,181	17.8x	16.5x	15.3x	26.3x	24.0x	22.2x	7.9x	7.4x	7.0x
HR Outsourcing Average		21.5x	17.9x	15.9x	24.0x	27.1x	23.0x	6.1x	5.5x	5.1x
Information Services										
Broadridge Financial Solutions, Inc.	22,071	16.8x	15.6x	14.5x	23.1x	21.4x	19.6x	3.7x	3.5x	3.3x
Dye & Durham Ltd.	2,222	14.0x	12.7x	10.3x	0.1x	0.1x	0.1x	4.6x	4.7x	4.4x
Deluxe Corporation	2,001	4.8x	5.0x	4.8x	3.6x	4.7x	4.4x	0.9x	0.9x	0.9x
Information Services Corp	423	6.6x	6.4x	6.1x	10.8x	10.3x	9.6x	2.2x	2.1x	2.0x
Information Services Average		10.5x	9.9x	8.9x	9.4x	9.1x	8.4x	2.9x	2.8x	2.7x
Financial Services Technology										
Fidelity National Information Services	51,033	8.2x	8.4x	7.9x	8.3x	9.3x	8.5x	3.5x	3.5x	3.4x
Fiserv, Inc.	95,145	13.1x	12.0x	11.1x	18.4x	16.2x	14.3x	5.7x	5.3x	4.9x
Jack Henry & Associates, Inc.	11,473	18.2x	16.7x	15.4x	31.7x	30.4x	27.7x	5.7x	5.4x	5.1x
ACI Worldwide, Inc.	3,758	10.1x	9.8x	9.1x	20.3x	24.9x	17.3x	2.6x	2.6x	2.5x
Temenos AG	6,266	17.1x	16.3x	14.3x	26.1x	24.4x	21.1x	6.6x	6.3x	5.7x
Global Payments Inc.	39,748	10.2x	9.2x	8.5x	11.1x	10.0x	8.8x	4.9x	4.6x	4.3x
Financial Services Technology Average		12.8x	12.1x	11.0x	19.3x	19.2x	16.3x	4.8x	4.6x	4.3x
Diversified Real Estate Services										
Colliers International Group Inc.	5,865	9.3x	8.7x	7.9x	13.2x	13.3x	11.7x	1.3x	1.3x	1.2x
Altus Group Limited	1,995	14.7x	14.6x	11.4x	21.5x	20.0x	17.4x	2.7x	2.5x	2.3x
CBRE Group, Inc. Class A	25,040	8.6x	9.7x	8.6x	12.9x	15.2x	12.7x	0.8x	0.8x	0.7x
Jones Lang LaSalle Incorporated	9,021	7.2x	8.3x	6.9x	8.7x	10.5x	8.1x	0.4x	0.4x	0.4x
Diversified Real Estate Services Average		10.0x	10.3x	8.7x	14.1x	14.8x	12.5x	1.3x	1.3x	1.2x
Software Focused IT Solutions/VARs										
Softchoice Corporation* USD	873	10.7x	10.0x	9.1x	16.4x	16.3x	14.5x	2.8x	2.6x	2.5x
Softcat Plc*	2,579	15.1x	13.5x	12.5x	20.2x	18.9x	17.9x	6.2x	5.3x	4.8x
Crayon Group Holding ASA*	9,173	>50	>50	>50	>50	>50	>50	20.7x	18.0x	15.5x
Bytes Technology Group Plc*	952	14.0x	12.4x	11.0x	19.0x	17.6x	15.7x	NA	NA	NA
Bytes Technology Group Plc* Average		13.3x	12.0x	10.9x	18.5x	17.6x	16.0x	9.9x	8.6x	7.6x
Business Services Average		12.7x	11.6x	10.5x	16.8x	16.8x	14.6x	3.8x	3.5x	3.2x

*Share Price Converted to USD

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

Note: Bolded names are covered by CIBC World Markets Inc.

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

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