

Twilio

4Q23 Wrap: Light guidance and strategic uncertainty support cautious view

Reiterate Rating: UNDERPERFORM | PO: 55.00 USD | Price: 72.27 USD

Transitions are difficult and disruptive

Twilio has undergone several rounds of RIFs, re-segmentation and management changes over the last twelve months. These changes, while necessary, have been disruptive operationally, in our view. Management announced an operational review of the Segment business at 4Q results, which it expects to complete and announce in early March. As recently as early 2023 Segment was projected as a >20% top line grower and significant contributor to firm value...it grew 4% Y/Y in 4Q. We believe the most likely outcome of the review is expense rationalization in the Segment business. Sale is a lower probability event, in our view, based on investments potential strategic partners have made in CDP and the operational profile of the business.

Bull case support hasn't materialized

In our [3Q SMID Software Preview](#) (see note), we noted that the TWLO bull case hinges on a volume-based recovery in the Communications segment and successful execution of the go-to-market revamp in D&A (now Segment). We also noted that recent checks supported our view of a slower recovery in volume and longer cycle to bookings growth. Management noted they haven't been affected by competitive intensity and highlighted several large bookings in the quarter. However, a volume-based recovery remains elusive and the Segment go-to-market revamp is less certain.

1Q24 guidance soft, no FY24 outlook provided

Twilio reported 4Q23 results with total revenue relatively in line with its preannouncement for a beat. 1Q24 revenue guidance was disappointing at \$1,030mn (mid-point) versus consensus of \$1,049mn and implies Q/Q revenue pressure, and no FY24 guidance was provided (awaiting clarity on Segment evaluation). TWLO also announced another revenue recategorization (see page 3 for details).

Reiterate Underperform and PO of \$55

We update our estimates to reflect results/guidance and reiterate our PO of \$55 based on a target multiple of 2.2x (we roll forward our multiple) EV/C25Rev (0.2x EV/Rev/G). Our target multiple is a discount to the communication software peer group trading at 2.6x EV/C25Rev and 0.3x EV/Rev/G. We believe a discount is justified based on TWLO's lower expected usage, potential margin pressure, and intensifying competition.

Estimates (Dec) (US\$)	2022A	2023A	2024E	2025E	2026
EPS	(0.15)	2.44	2.97	3.24	NA
GAAP EPS	(6.86)	(5.53)	(2.86)	(2.19)	NA
EPS Change (YoY)	40.0%	NM	21.7%	9.1%	NA
Consensus EPS (Bloomberg)			2.46	3.20	3.28
DPS	0	0	0	0	NA
Valuation (Dec)					
P/E	NM	29.6x	24.3x	22.3x	NA
EV / EBITDA*	197.0x	21.6x	20.2x	18.4x	NA
Free Cash Flow Yield*	-2.5%	2.7%	3.3%	3.9%	NA

* For full definitions of *IQmethod*SM measures, see page 9.

14 February 2024

Equity

Key Changes

(US\$)	Previous	Current
2024E Rev (m)	4,383.9	4,331.1
2025E Rev (m)	4,818.6	4,740.9
2024E EPS	2.20	2.97
2025E EPS	2.53	3.24

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Stock Data

Price	72.27 USD
Price Objective	55.00 USD
Date Established	9-May-2023
Investment Opinion	C-3-9
52-Week Range	45.02 USD - 79.70 USD
Mrkt Val (mn) / Shares Out	13,397 USD / 185.4 (mn)
Free Float	95.7%
Average Daily Value (mn)	179.42 USD
BofA Ticker / Exchange	TWLO / NYS
Bloomberg / Reuters	TWLO US / TWLO.N
ROE (2024E)	5.8%
Net Dbt to Eqty (Dec-2023A)	-4.9%
ESGMeter™	Medium

ESGMeter is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of BofA Global Research's equity investment rating, volatility risk rating, income rating, and price objective for that company. For full details, refer to ["BofA ESGMeter Methodology"](#).

CDP = Customer Data Platform

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Refer to important disclosures on page 11 to 13. Analyst Certification on page 8. Price Objective Basis/Risk on page 8.

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iQprofileSM Twilio

iQmethodSM – Bus Performance*

(US\$ Millions)	2022A	2023A	2024E	2025E	2026
Return on Capital Employed	0%	4.2%	4.7%	5.2%	NA
Return on Equity	-0.2%	4.5%	5.8%	6.4%	NA
Operating Margin	-0.1%	12.8%	13.2%	13.3%	NA
Free Cash Flow	(335)	364	437	522	NA

iQmethodSM – Quality of Earnings*

(US\$ Millions)	2022A	2023A	2024E	2025E	2026
Cash Realization Ratio	NM	0.9x	0.9x	0.9x	NA
Asset Replacement Ratio	0.3x	0.2x	0.2x	0.2x	NA
Tax Rate	NM	NM	NM	NM	NA
Net Debt-to-Equity Ratio	-3.9%	-4.9%	-9.4%	-14.8%	NA
Interest Cover	NA	NA	NA	NA	NA

Income Statement Data (Dec)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026
Sales	3,826	4,154	4,331	4,741	NA
% Change	34.6%	8.6%	4.3%	9.5%	NA
Gross Profit	1,958	2,184	2,281	2,497	NA
% Change	28.8%	11.6%	4.4%	9.5%	NA
EBITDA	68	625	666	735	NA
% Change	10.2%	813.2%	6.6%	10.3%	NA
Net Interest & Other Income	(16)	(168)	(36)	(36)	NA
Net Income (Adjusted)	(27)	454	560	623	NA
% Change	38.0%	NM	23.3%	11.1%	NA

Free Cash Flow Data (Dec)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026
Net Income from Cont Operations (GAAP)	(1,256)	(1,015)	(533)	(417)	NA
Depreciation & Amortization	279	284	288	293	NA
Change in Working Capital	(397)	(231)	(100)	(75)	NA
Deferred Taxation Charge	NA	NA	NA	NA	NA
Other Adjustments, Net	1,119	1,376	833	775	NA
Capital Expenditure	(80)	(51)	(50)	(55)	NA
Free Cash Flow	-335	364	437	522	NA
% Change	-125.7%	NM	20.2%	19.5%	NA
Share / Issue Repurchase	(13)	0	0	0	NA
Cost of Dividends Paid	0	0	0	0	NA
Change in Debt	0	0	0	0	NA

Balance Sheet Data (Dec)

(US\$ Millions)	2022A	2023A	2024E	2025E	2026
Cash & Equivalents	652	656	1,093	1,615	NA
Trade Receivables	548	563	700	694	NA
Other Current Assets	3,785	3,685	3,217	2,741	NA
Property, Plant & Equipment	264	210	164	113	NA
Other Non-Current Assets	7,316	6,496	6,588	6,666	NA
Total Assets	12,564	11,610	11,762	11,829	NA
Short-Term Debt	54	50	50	50	NA
Other Current Liabilities	754	688	898	956	NA
Long-Term Debt	186	130	130	130	NA
Other Non-Current Liabilities	1,011	1,009	1,000	997	NA
Total Liabilities	2,005	1,877	2,078	2,133	NA
Total Equity	10,559	9,733	9,684	9,696	NA
Total Equity & Liabilities	12,564	11,610	11,762	11,829	NA

* For full definitions of iQmethodSM measures, see page 9.

Company Sector

Server & Enterprise Software

Company Description

Twilio is a customer engagement platform that allows developers to incorporate communication and data capabilities, including voice, messaging, video, and authentication, into software applications, via Application Programming Interfaces (APIs). Twilio sells its products primarily by focusing on and servicing software developers.

Investment Rationale

We believe Twilio leads the high-growth Communications Platform as a Service (CPaaS) market. However, in a deteriorating macro environment, TWLO's consumption based pricing model is a downside risk to its medium term organic growth guidance. TWLO's lower expected usage, potential margin pressure, intensifying competition, and pricing pressure drives our Underperform rating.

Stock Data

Average Daily Volume

2,482,638

Quarterly Earnings Estimates

	2023	2024
Q1	0.47A	0.72E
Q2	0.54A	0.74E
Q3	0.58A	0.75E
Q4	0.85A	0.75E

1Q24 guidance soft, no FY24 outlook provided

Twilio reported 4Q23 results with total revenue of \$1,076mn, which was above the high-end of guidance (consistent with TWLO's preannouncement), our forecast and consensus at \$1,049mn/\$1,042mn. 1Q24 revenue guidance was disappointing at \$1,030mn (mid-point) versus consensus of \$1,049mn and implies Q/Q revenue pressure. Dollar-based net expansion of 102% expanded QoQ from 101% in the prior quarter, but total active customer accounts declined. Non-GAAP gross margin contracted QoQ to 52.4% and was lower than our estimate of 52.8%. Non-GAAP operating income of \$173mn was above consensus of \$126.5mn, but 1Q24 guidance of \$125mn was below the Street estimates at \$128mn and also implies Q/Q pressure. TWLO also announced another revenue recategorization, moving Flex and Marketing Campaigns into Communications and renaming the D&A to Segment.

Exhibit 1: Variance analysis

TWLO beat our 4Q23 revenue estimate by 3%

\$ in Thousands (except per share data)	BofA Estimates	4Q23 Actuals	Variance
Total revenues	\$1,049,447	\$1,075,950	3%
Total cost of revenues	\$495,853	\$512,327	3%
Gross profit	\$553,594	563,623	2%
Operating expenses			
Research and development	\$146,923	\$149,241	2%
Sales and marketing	\$194,148	\$179,671	-7%
General and administrative	\$78,709	\$62,071	-21%
Total operating expense	\$419,779	\$390,983	-7%
Other income (expense), net	(\$9,079)	(\$46,725)	NA
Net income before taxes	\$124,736	\$125,915	1%
Corporate tax expense	\$3,742	(\$32,558)	-970%
Proforma net income	\$120,994	\$158,473	31%
Proforma EPS	0.66	0.85	30%
Diluted shares outstanding (proforma)	184,252	185,380	1%
Margin Analysis			
Gross margin	52.8%	52.4%	0%
Research and development	14.0%	13.9%	-1%
Sales and marketing	18.5%	16.7%	-10%
General and administrative	7.5%	5.8%	-23%
Operating margin	12.8%	16.0%	3%
Pre-tax margin	11.9%	11.7%	0%
Tax rate – pro forma	3.0%	-25.9%	-29%
Net Margin	11.5%	14.7%	3%
Balance Sheet & Cash Flow Analysis			
Total cash and equiv.	\$3,542,352	\$4,011,995	13%
Cash Flow from Operations	3,007	222,545	7300%
Free Cash Flow	(\$10,057)	\$210,855	NA

Source: BofA Global Research estimates, company filings

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Exhibit 2: Estimate changes

We are lowering our FY24 revenue estimate

	1Q24E				2024E				2025E			
	Previous	Previous Y/Y	New	New Y/Y	Previous	Previous Y/Y	New	New Y/Y	Previous	Previous Y/Y	New	New Y/Y
Total revenues	\$1,064,116	5.7%	\$1,037,039	3.0%	\$4,383,876	6.2%	\$4,331,131	4.3%	\$4,818,629	9.9%	\$4,740,880	9.5%
Proforma net income	\$102,391	16.0%	\$135,169	53.1%	\$418,729	0.5%	\$560,238	23.3%	\$488,380	16.6%	\$622,578	11.1%
Pro forma EPS	\$0.54	16.3%	\$0.72	54.8%	\$2.20	-2.0%	\$2.97	21.5%	\$2.53	14.9%	\$3.24	9.1%

Source: BofA Global Research estimates

BofA GLOBAL RESEARCH

Exhibit 3: Income statement

TWLO reported 4Q23 revenues of \$1,075mn

\$ Thousands, except EPS	YEAR FY22A	YEAR FY23A	Mar 1Q24E	Jun 2Q24E	Sep 3Q24E	Dec 4Q24E	YEAR FY24E	YEAR FY25E	YEAR FY26E
Total revenues	3,826,321	4,153,945	1,037,039	1,067,007	1,097,781	1,129,304	4,331,131	4,740,880	5,233,841
Y/Y rev growth	34.6%	8.6%	3.0%	2.8%	6.2%	5.0%	4.3%	9.5%	10.4%
Q/Q rev growth									
Communications revenue (new)		3,858,693	960,883	989,710	1,019,401	1,049,983	4,019,977	4,391,372	4,826,587
Y/Y			NA	NA	6.2%	4.9%	4.2%	9.2%	9.9%
Q/Q			-4.0%	3.0%	3.0%	3.0%			
Segment revenue		295,252	76,155	77,298	78,380	79,321	311,154	349,509	407,254
Y/Y			NA	NA	7.4%	5.7%	5.4%	12.3%	16.5%
Q/Q			1.5%	1.5%	1.4%	1.2%			
Total cost of revenues	1,868,416	1,969,707	490,633	504,669	519,885	535,115	2,050,302	2,243,867	2,470,032
Adjusted Gross profit (total)	1,957,905	2,184,238	546,405	562,339	577,896	594,189	2,280,828	2,497,013	2,763,810
Operating expenses									
Research and Development	691,281	602,085	155,556	163,252	169,058	175,042	662,908	718,293	740,640
Sales and Marketing	916,543	757,662	178,371	181,391	187,721	194,240	741,723	814,231	846,542
General and Administrative	354,571	291,484	74,667	75,758	76,845	79,051	306,320	335,239	343,974
Total operating expense	1,962,395	1,651,231	408,593	420,401	433,623	448,334	1,710,951	1,867,764	1,931,156
Income/(Loss) from operations	(4,490)	533,007	137,812	141,938	144,272	145,855	569,877	629,249	832,653
EBITDA	68,456	625,113	160,802	166,041	168,711	170,805	666,359	734,784	949,122
Other income (expense), net	(15,526)	(168,033)	(9,079)	(9,079)	(9,079)	(9,079)	(36,318)	(36,318)	(36,318)
Net income before taxes	(20,016)	364,974	128,733	132,858	135,193	136,776	533,560	592,932	796,336
Corporate tax expense	6,754	(89,331)	(6,437)	(6,643)	(6,760)	(6,839)	(26,678)	(29,647)	(39,817)
Proforma net income	(26,770)	454,305	135,169	139,501	141,952	143,614	560,238	622,578	836,152
Proforma EPS	(0.15)	2.44	0.72	0.74	0.75	0.75	2.97	3.24	4.17
Basic shares outstanding	182,994	183,743	184,617	185,903	187,317	188,708	186,636	190,224	198,312
Diluted shares outstanding (pro forma)	182,994	185,916	186,670	187,955	189,369	190,761	188,689	192,276	200,364

Source: BofA Global Research estimates, company filings

BofA GLOB



Exhibit 4: Balance sheet

TWLO ended 2023 with \$4bn+ in cash and equivalents

\$ Thousands	YEAR FY22A	YEAR FY23A	Mar 1Q24E	Jun 2Q24E	Sep 3Q24E	Dec 4Q24E	YEAR FY24E	YEAR FY25E	YEAR FY26E
Current Assets									
Cash and cash equivalents	651,752	655,931	801,558	882,463	988,422	1,093,007	1,093,007	1,615,253	2,294,502
Short-term marketable securities	3,503,317	3,356,064	3,231,064	3,106,064	2,981,064	2,856,064	2,856,064	2,356,064	2,356,064
Accounts receivable, net	547,507	562,773	622,223	661,545	680,624	700,168	700,168	694,007	754,090
Prepaid expenses and other current assets	281,510	329,204	331,852	341,442	351,290	361,377	361,377	384,859	418,177
Total Current Assets	4,984,086	4,903,972	4,986,698	4,991,514	5,001,400	5,010,616	5,010,616	5,050,183	5,822,834
Restricted cash	-	-	-	-	-	-	-	-	-
Property and equipment, net	263,979	209,639	199,485	187,488	175,520	163,543	163,543	112,648	56,427
Operating right of use asset	121,341	73,959	62,222	53,350	43,911	33,879	33,879	-	-
Intangible assets, net	849,935	350,490	350,490	350,490	350,490	350,490	350,490	350,490	350,490
Goodwill	5,284,153	5,243,266	5,243,266	5,243,266	5,243,266	5,243,266	5,243,266	5,243,266	5,243,266
Other long-term assets	1,060,810	828,381	881,483	906,956	933,114	959,908	959,908	1,072,557	1,165,413
Total Assets	12,564,304	11,609,707	11,723,644	11,733,064	11,747,701	11,761,702	11,761,702	11,829,143	12,638,430
Current Liabilities									
Accounts payable	124,605	119,615	134,815	138,711	142,712	146,809	146,809	157,729	171,384
Accrued expenses and other current liabilities	490,221	424,311	549,630	565,514	581,824	598,531	598,531	643,534	699,248
Deferred revenue	139,110	144,499	140,000	144,046	148,200	152,456	152,456	155,205	168,642
Operating lease liability, current	54,222	49,872	49,872	49,872	49,872	49,872	49,872	49,872	49,872
Financing lease liability, current	-	-	-	-	-	-	-	-	-
Note payable, current	-	-	-	-	-	-	-	-	-
Other	-	-	-	-	-	-	-	-	-
Total Current liabilities	808,158	738,297	874,318	898,143	922,608	947,668	947,668	1,006,340	1,089,146
Operating lease liability, noncurrent	164,551	120,770	120,770	120,770	120,770	120,770	120,770	120,770	120,770
Financing lease liability, noncurrent	21,290	9,191	9,191	9,191	9,191	9,191	9,191	9,191	9,191
Note payable, noncurrent	-	-	-	-	-	-	-	-	-
Convertible senior notes, net	987,382	988,953	988,953	988,953	988,953	988,953	988,953	988,953	988,953
Other long-term liabilities	23,881	19,944	13,482	12,804	12,076	11,293	11,293	7,571	8,226
Total Liabilities	2,005,262	1,877,155	2,006,713	2,029,861	2,053,597	2,077,875	2,077,875	2,132,825	2,216,286
Convertible preferred stock									
Common stock	186	182	182	182	182	182	182	182	182
Additional paid-in capital	14,055,853	14,797,723	14,863,818	14,930,002	14,996,213	15,062,420	15,062,420	15,323,603	15,584,797
Accumulated deficit	(3,375,836)	(5,065,972)	(5,147,688)	(5,227,599)	(5,302,910)	(5,379,394)	(5,379,394)	(5,628,086)	(5,163,454)
Accumulated other comprehensive income/(loss)	(121,161)	619	619	619	619	619	619	619	619
Total stockholders' equity	10,559,042	9,732,552	9,716,931	9,703,203	9,694,104	9,683,827	9,683,827	9,696,318	10,422,143
Total liabilities and shareholder equity	12,564,304	11,609,707	11,723,644	11,733,064	11,747,701	11,761,702	11,761,702	11,829,143	12,638,430

Source: BoFA Global Research estimates, company filings

Exhibit 5: Cash flow statement

We expect TWLO to generate \$487mn in 2024 CFO

\$ Thousands, except EPS	YEAR FY22A	YEAR FY23A	Mar 1Q24E	Jun 2Q24E	Sep 3Q24E	Dec 4Q24E	YEAR FY24E	YEAR FY25E	YEAR FY26E
Cash Flows from Operations:	(1,256,145)	(1,015,441)	(133,012)	(130,968)	(134,738)				
Net Income	()	()	()	()	()	(134,431)	(533,149)	(416,711)	(273,031)
Depreciation and Amortization	279,127	284,413	70,861	71,975	72,310	72,821	287,968	293,446	304,381
Right of use asset amortization	47,160	26,971	11,737	8,872	9,439	10,032	40,080	33,879	-
Amortization of bond premium	33,165	(44)					-	-	-
Amortization of debt issuance costs	-	-					-	-	-
Impairment of long-lived assets	97,722	320,504					-	-	-
Accretion of debt discount	-	-					-	-	-
Stock based compensation	798,560	675,857	176,297	176,056	184,427	182,947	719,727	668,019	737,663
Amortization of deferred commissions	57,913	72,892	18,223	18,313	18,340	18,335	73,211	73,272	73,282
Provision for doubtful accounts	-	51,859					-	-	-
Allowance for credit losses	35,012	-					-	-	-
Write-off of internally developed software	-	-					-	-	-
Other, net, litigation/acquisition costs	49,761	228,386					-	-	-
Changes in Working Capital Accounts									
Accounts Receivable	(194,655)	(85,093)	(59,450)	(39,321)	(19,080)	(19,544)	(137,395)	6,161	(60,083)
Prepaid expenses and other current assets	(94,326)	(56,283)	(2,648)	(9,590)	(9,848)	(10,087)	(32,173)	(23,481)	(33,319)
Other long-term assets	(146,458)	(2,328)	(53,102)	(25,474)	(26,157)	(26,794)	(131,527)	(112,649)	(92,856)
Accounts payable	30,336	12,370	15,200	3,896	4,001	4,098	27,194	10,919	13,655
Accrued expenses and other current liabilities	75,430	(51,816)	125,319	15,883	16,310	16,707	174,220	45,003	55,714
Deferred Revenue	(2,688)	5,371	(4,499)	4,046	4,154	4,256	7,957	2,749	13,437
Operating right of use liability	(54,450)	(56,340)					-	-	-
Other long-term liabilities	(9,832)	3,474	(6,462)	(677)	(728)	(783)	(8,651)	(3,722)	655
Total Cash Flow from Operating Activities	(254,368)	414,752	158,463	93,011	118,430	117,557	487,461	576,885	739,497
EBITDA	68,456	625,113	160,802	166,041	168,711	170,805	666,359	734,784	949,122
Investing Activities:									
Increase in restricted cash	-	-					-	-	-
	(1,938,337)	(1,953,003)					-	-	-
Purchases of marketable securities	()	()					-	-	-
Maturities/sale of marketable securities	1,439,477	2,200,417	125,000	125,000	125,000	125,000	500,000	500,000	-
Capitalized software development costs	(45,761)	(39,925)	(9,978)	(10,219)	(10,441)	(10,572)	(41,210)	(44,964)	(49,603)
Purchases of property and equipment	(34,421)	(11,310)	(2,858)	(1,887)	(2,029)	(2,400)	(9,175)	(9,675)	(10,645)
Purchases of intangible assets	-	-					-	-	-
Acquisition, net of cash acquired	(37,410)	(5,770)					-	-	-
Other	-	38,194					-	-	-
Total Cash Flow from Investing Activities	(616,452)	228,603	112,164	112,894	112,529	112,028	449,615	445,361	(60,248)
Financing Activities:									
Proceeds from issuance of converts, net	(13,423)	-					-	-	-
Payments on debt and finance leases	-	(16,134)					-	-	-
Proceeds from the initial public offering, net	-	-					-	-	-
Proceeds from the follow-on public offering, net	-	-					-	-	-
Payments of costs related to public offerings	(35)	-					-	-	-
Net proceeds from issuance of convertible	-	-					-	-	-
Proceeds from exercises of stock options	59,563	43,840					-	-	-
Proceeds from share issued in ESPP	-	-					-	-	-
Value of equity awards withheld for tax liabilities	(1,098)	(2,565)					-	-	-
Share repurchase	-	(668,751)	(125,000)	(125,000)	(125,000)	(125,000)	(500,000)	(500,000)	-
Changes in Financing Activities	45,007	(643,610)	(125,000)	(125,000)	(125,000)	(125,000)	(500,000)	(500,000)	-
Currency Adjustments	60	108					-	-	-
Change in Cash and Cash Equivalents	(825,753)	(147)	145,627	80,904	105,959	104,585	437,076	522,246	679,249
Cash Beginning Balance	1,481,831	656,078	655,931	801,558	882,463	988,422	655,931	1,093,007	1,615,253
Cash Ending Balance + restricted cash	656,078	655,931	801,558	882,463	988,422	7	1,093,007	1,615,253	2,294,502
Restricted cash/assets held for sale	4,326	-	-	-	-	-	-	-	-
Cash Ending Balance	651,752	655,931	801,558	882,463	988,422	7	1,093,007	1,615,253	2,294,502

Exhibit 5: Cash flow statement

We expect TWLO to generate \$487mn in 2024 CFO

\$ Thousands, except EPS	YEAR	YEAR	Mar	Jun	Sep	Dec	YEAR	YEAR	YEAR
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Source: BofA Global Research estimates, company filings

BofA GLOBAL RESEARCH



Price objective basis & risk

Twilio (TWLO)

Our \$55 PO is based on 2.2x EV/C25eRev (EV/Rev/G multiple of 0.2x). Our multiple is a discount to the communication software comp group trading at 2.6x. We believe a discount is justified based on TWLO's lower expected usage, potential margin pressure, and intensifying competition.

Upside risks to our PO are 1) faster-than-expected reacceleration of organic revenue growth, 2) macro recovery driving better-than-expected usage rates, and 3) higher-than-expected revenue mix of software versus core messaging, voice and email.

Downside risks to our PO are 1) increased competition from larger platform vendors, 2) possible price pressure, 3) deterioration in the macro economy, 4) decrease in ability to monetize the platform via developers, 5) deterioration in gross margins, 6) missteps causing growth to dip below management's targets, 7) major network and product issues.

Analyst Certification

I, Michael J. Funk, hereby certify that the views expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or view expressed in this research report.

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
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	8x8	EGHT	EGHT US	Michael J. Funk
	Adobe	ADBE	ADBE US	Brad Sills
	Alarm.com	ALRM	ALRM US	Michael J. Funk
	Amplitude, Inc.	AMPL	AMPL US	Koji Ikeda, CFA
	BILL	BILL	BILL US	Brad Sills
	CCC Intelligent Solutions	CCCS	CCCS US	Michael J. Funk
	Dropbox	DBX	DBX US	Michael J. Funk
	Dynatrace	DT	DT US	Koji Ikeda, CFA
	Elastic NV	ESTC	ESTC US	Koji Ikeda, CFA
	GitLab Inc.	GTLB	GTLB US	Koji Ikeda, CFA
	Global-e Online Ltd.	GLBE	GLBE US	Koji Ikeda, CFA
	HubSpot	HUBS	HUBS US	Brad Sills
	Informatica Inc.	INFA	INFA US	Koji Ikeda, CFA
	Intapp Inc.	INTA	INTA US	Koji Ikeda, CFA
	Intuit	INTU	INTU US	Brad Sills
	JFrog Ltd	FROG	FROG US	Koji Ikeda, CFA
	MeridianLink, Inc.	MLNK	MLNK US	Koji Ikeda, CFA
	Microsoft Corporation	MSFT	MSFT US	Brad Sills
	MongoDB Inc	MDB	MDB US	Brad Sills
	nCino, Inc.	NCNO	NCNO US	Adam Bergere
	NICE Ltd.	NICE	NICE US	Michael J. Funk
	NICE Ltd.	NCSYF	NICE IT	Michael J. Funk
	PagerDuty	PD	PD US	Koji Ikeda, CFA
	PowerSchool Holdings, Inc.	PWSC	PWSC US	Koji Ikeda, CFA
	RingCentral	RNG	RNG US	Michael J. Funk
	Salesforce.com	CRM	CRM US	Brad Sills
	ServiceNow	NOW	NOW US	Brad Sills
	UiPath	PATH	PATH US	Brad Sills
	Unity	U	U US	Michael J. Funk
	Weave	WEAV	WEAV US	Michael J. Funk
	Workday Inc.	WDAY	WDAY US	Brad Sills
	Zeta Global	ZETA	ZETA US	Koji Ikeda, CFA
	ZoomInfo	ZI	ZI US	Koji Ikeda, CFA

US - Enterprise Software Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
NEUTRAL				
	Autodesk	ADSK	ADSK US	Michael J. Funk
	Bentley Systems	BSY	BSY US	Michael J. Funk
	BigCommerce Holdings, Inc.	BIGC	BIGC US	Koji Ikeda, CFA
	Coveo	YCVO	CVO CN	Koji Ikeda, CFA
	Datadog Inc	DDOG	DDOG US	Koji Ikeda, CFA
	DocuSign	DOCU	DOCU US	Brad Sills
	Freshworks, Inc.	FRSH	FRSH US	Adam Bergere
	HashiCorp	HCP	HCP US	Brad Sills
	Jamf	JAMF	JAMF US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	LSPD	LSPD US	Koji Ikeda, CFA
	Lightspeed Commerce Inc.	YLSPD	LSPD CN	Koji Ikeda, CFA
	Oracle Corporation	ORCL	ORCL US	Brad Sills
	Paycom	PAYC	PAYC US	Adam Bergere
	Paylocity	PCTY	PCTY US	Adam Bergere
	Shopify, Inc.	SHOP	SHOP US	Brad Sills
	Snowflake	SNOW	SNOW US	Brad Sills
	Veeva Systems, Inc.	VEEV	VEEV US	Brad Sills
	Zoom Video Communications	ZM	ZM US	Michael J. Funk
UNDERPERFORM				
	AvidXchange, Inc.	AVDX	AVDX US	Brad Sills
	Blackbaud, Inc.	BLKB	BLKB US	Koji Ikeda, CFA
	BlackLine, Inc.	BL	BL US	Koji Ikeda, CFA
	C3.ai	AI	AI US	Brad Sills
	Confluent	CFLT	CFLT US	Brad Sills
	CS Disco, Inc.	LAW	LAW US	Koji Ikeda, CFA
	Enfusion, Inc.	ENFN	ENFN US	Koji Ikeda, CFA
	Five9	FIVN	FIVN US	Michael J. Funk
	Guidewire Software, Inc.	GWRE	GWRE US	Michael J. Funk
	Twilio	TWLO	TWLO US	Michael J. Funk
	Vertex, Inc.	VERX	VERX US	Brad Sills
RSTR				
	Splunk	SPLK	SPLK US	Brad Sills

iQmethodSM Measures Definitions

Business Performance

Return On Capital Employed

Return On Equity

Operating Margin

Earnings Growth

Free Cash Flow

Quality of Earnings

Cash Realization Ratio

Asset Replacement Ratio

Tax Rate

Net Debt-To-Equity Ratio

Interest Cover

Valuation Toolkit

Price / Earnings Ratio

Price / Book Value

Dividend Yield

Free Cash Flow Yield

Enterprise Value / Sales

EV / EBITDA

Numerator

NOPAT = (EBIT + Interest Income) × (1 – Tax Rate) + Goodwill Amortization

Net Income

Operating Profit

Expected 5 Year CAGR From Latest Actual

Cash Flow From Operations – Total Capex

Numerator

Cash Flow From Operations

Capex

Tax Charge

Net Debt = Total Debt – Cash & Equivalents

EBIT

Numerator

Current Share Price

Current Share Price

Annualised Declared Cash Dividend

Cash Flow From Operations – Total Capex

EV = Current Share Price × Current Shares + Minority Equity + Net Debt +

Other LT Liabilities

Enterprise Value

Denominator

Total Assets – Current Liabilities + ST Debt + Accumulated Goodwill

Amortization

Shareholders' Equity

Sales

N/A

N/A

Denominator

Net Income

Depreciation

Pre-Tax Income

Total Equity

Interest Expense

Denominator

Diluted Earnings Per Share (Basis As Specified)

Shareholders' Equity / Current Basic Shares

Current Share Price

Market Cap = Current Share Price × Current Basic Shares

Sales

Basic EBIT + Depreciation + Amortization

Valuation Toolkit

Numerator

Denominator

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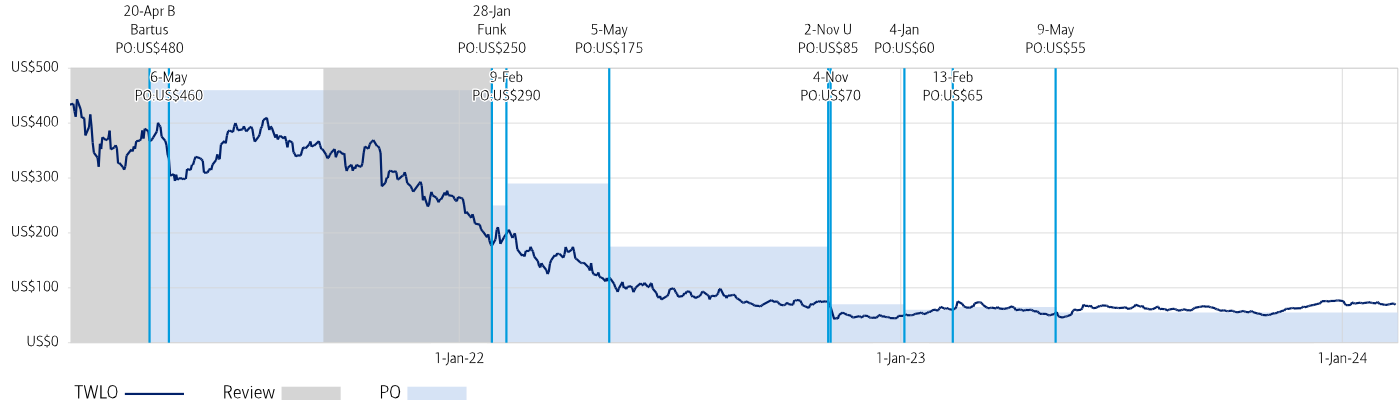
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B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

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Equity Investment Rating Distribution: Technology Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	215	53.09%	Buy	111	51.63%
Hold	97	23.95%	Hold	45	46.39%
Sell	93	22.96%	Sell	24	25.81%

Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
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Sell	807	22.84%	Sell	383	47.46%

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Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster ^{R2}
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Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

^{R2} Ratings dispersions may vary from time to time where BofA Global Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

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