

Sector Primer Series: Information Technology

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INTRODUCTION

Developed in 1999 and jointly managed by S&P Dow Jones Indices and MSCI, the Global Industry Classification Standard® (GICS®) assigns companies to a single classification at the sub-industry level according to their principal business activity using quantitative and qualitative factors, including revenues, earnings, and market perception. The sub-industry is the most specific level of the four-tiered, hierarchical industry classification system that includes 11 sectors, 24 industry groups, 69 industries, and 158 sub-industries, as of Dec. 31, 2018.

Companies primarily engaged in Software & Services, Technology Hardware & Equipment, and Semiconductors & Semiconductor Equipment are classified into industry groups that make up the Information Technology sector. It includes, but is not limited to, companies that develop and produce software, manufacture electronic equipment and instruments, provide commercial electronic data processing, and manufacture semiconductors and related products, as well as those that manufacture communication equipment and products including LANs, WANs, routers, telephones, switchboards, and exchanges.

Exhibit 1: GICS of the Information Technology Sector

SECTOR	INDUSTRY GROUP	INDUSTRY	SUB-INDUSTRY
Information Technology Code (45)	Software & Services Code (4510)	IT Services Code (451020)	IT Consulting & Other Services Code (45102010)
			Data Processing & Outsourced Services Code (45102020)
		Internet Services & Infrastructure Code (45102030)	
		Software Code (451030)	Application Software Code (45103010)
	Systems Software Code (45103020)		
	Technology Hardware & Equipment Code (4520)	Communications Equipment Code (452010)	Communications Equipment Code (45201020)
			Technology Hardware, Storage & Peripherals Code (452020)
		Electronic Equipment, Instruments & Components Code (452030)	Electronic Equipment & Instruments Code (45203010)
			Electronic Components Code (45203015)
			Electronic Manufacturing Services Code (45203020)
Technology Distributors Code (45203030)			
Semiconductors & Semiconductor Equipment Code (4530)	Semiconductors & Semiconductor Equipment Code (453010)	Semiconductor Equipment Code (45301010)	
		Semiconductors Code (45301020)	

Source: S&P Dow Jones Indices LLC, MSCI. Data as of Dec. 31, 2018. Table is provided for illustrative purposes.

COMPOSITION

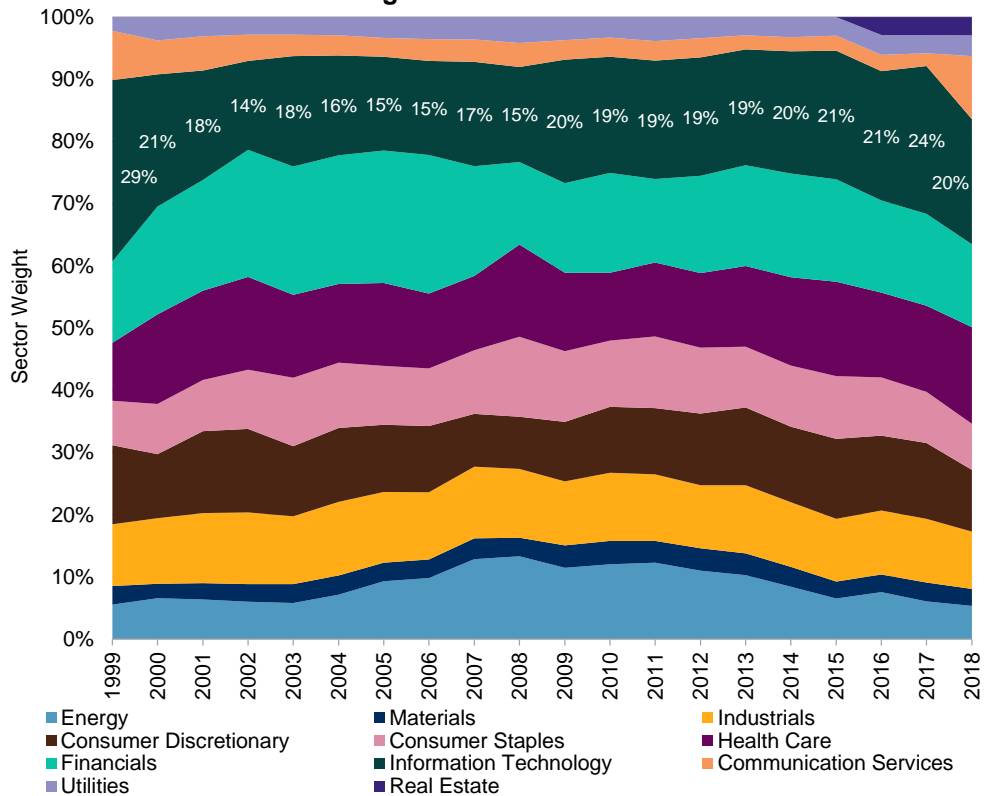
GICS assigns a company to a single sub-industry according to its business activity...

Created in 1957, the [S&P 500®](#) was the first broad U.S. market-cap-weighted stock market index. Today, it is the basis of many listed and over-the-counter investment instruments. The [S&P 500 Information Technology Index](#) comprises all companies included in the S&P 500 that are classified as members of the GICS Information Technology sector.

The Information Technology sector is the most heavily weighted of the 11 sectors within the S&P 500. Since the index is market capitalization weighted, this sector greatly influences the overall index performance. As of Dec. 31, 2018, the Information Technology sector represented 20.12% of the S&P 500. In fact, at the end of each year since the development of GICS in 1999, the Information Technology sector has had the highest weight in 13 of the 20 years (see Exhibit 2).

...using quantitative and qualitative factors, including revenues, earnings, and market perception.

Exhibit 2: S&P 500 Sector Weights since 1999



Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Chart is provided for illustrative purposes.

The system includes 11 sectors, 24 industry groups, 69 industries, and 158 sub-industries.

As of Dec. 31, 2018, there were 68 companies with a total float-adjusted market capitalization of USD 4,230,733.83 million in the S&P 500 Information Technology Index. The two largest companies in the index were Microsoft Corp (MSFT) and Apple Inc. (AAPL), with float-adjusted market caps of USD 785,025.90 million and USD 711,112.13 million, translating to index weights of 3.73% and 3.38%, respectively. These two companies were not only the largest companies within the Information

Information Technology has had the largest sector weight in the S&P 500 in 13 of the past 20 years.

Technology sector, but also the two largest in the S&P 500. The mean market cap was USD 62,216.67 million, the median market cap was USD 18,805.05 million, and the minimum market cap was USD 4,053.29 million. The top 10 holdings made up 13.05% of the S&P 500 Information Technology Index (see Exhibit 3).

Exhibit 3: Snapshot of the Top 10 Holdings in the S&P 500 Information Technology Index

CONSTITUENT NAME	TICKER	INDEX WEIGHT (%)
Microsoft Corp	MSFT	3.73
Apple Inc.	AAPL	3.38
Visa Inc. A	V	1.10
Intel Corp	INTC	1.02
Cisco Systems Inc.	CSCO	0.93
Mastercard Inc. A	MA	0.82
Oracle Corp	ORCL	0.55
Adobe Inc.	ADBE	0.53
Broadcom Inc.	AVGO	0.50
Salesforce.com	CRM	0.50
Total		13.05

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Table is provided for illustrative purposes.

In the S&P 500 Information Technology Index, there are 68 companies with a total float market cap of USD 4,230,733.83 million.

Despite historically being the heaviest sector in the S&P 500, Information Technology was the third heaviest sector in the [S&P MidCap 400®](#) and [S&P SmallCap 600®](#), at 15.27% and 14.43%, respectively, as of Dec. 31, 2018. Financials and Industrials were larger in both the mid- and small-cap indices. Overall in the [S&P Total Market Index](#), which consists of over 3,800 stocks—including those in the S&P 500, S&P MidCap 400, S&P SmallCap 600, and micro caps—the Information Technology sector was the largest, at 19.40%, followed by Health Care (15.02%) and Financials (13.93%).

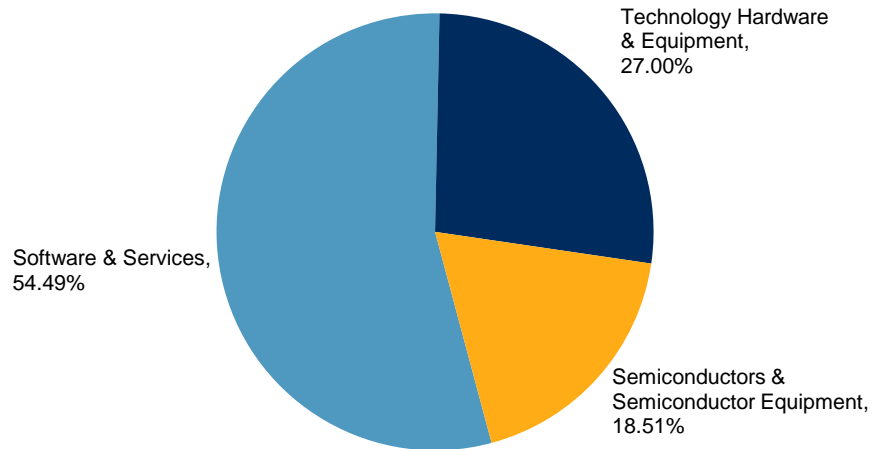
The Information Technology sector was the third heaviest sector in the S&P MidCap 400 and S&P SmallCap 600.

GICS is a four-tiered, hierarchical industry classification system that organizes companies quantitatively and qualitatively. Under the GICS structure, the Information Technology sector has 3 industry groups, 6 industries, and 13 sub-industries. Within the S&P 500 Information Technology Index as of Dec. 31, 2018, Software & Services had the heaviest weight of the three industry groups, with over 50% of the sector. Similarly, the two industries within Software & Services had the top two weights in the sector, at 30.67% (Software) and 23.82% (IT Services). Systems Software, one of the five sub-industries within the Software & Services industry group, accounted for 22.53% of the sector. This sub-industry is defined as companies engaged in developing and producing systems and database management software, such as Microsoft Corp (MSFT) and Oracle Corp (ORCL).

Exhibit 4: Industry Group, Industry, and Sub-Industry Weights in the S&P 500 Information Technology Index

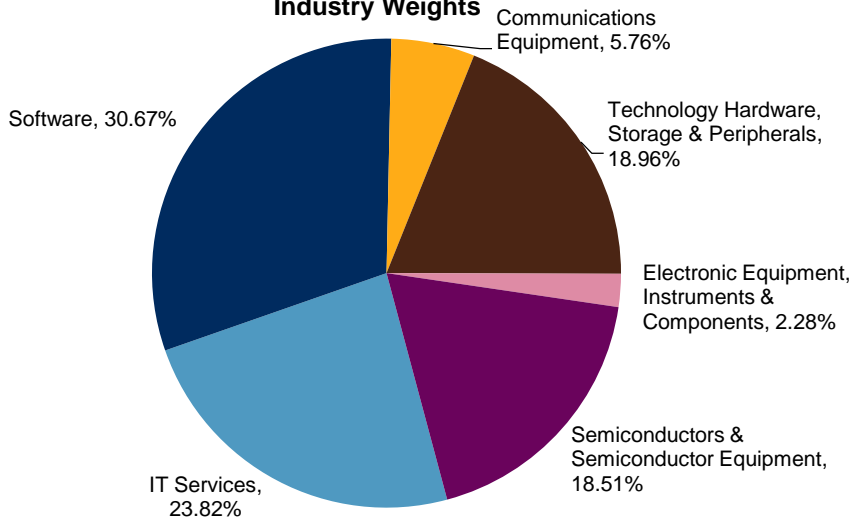
The Software & Services industry group had the heaviest weight, with over 50% of the sector.

Industry Group Weights



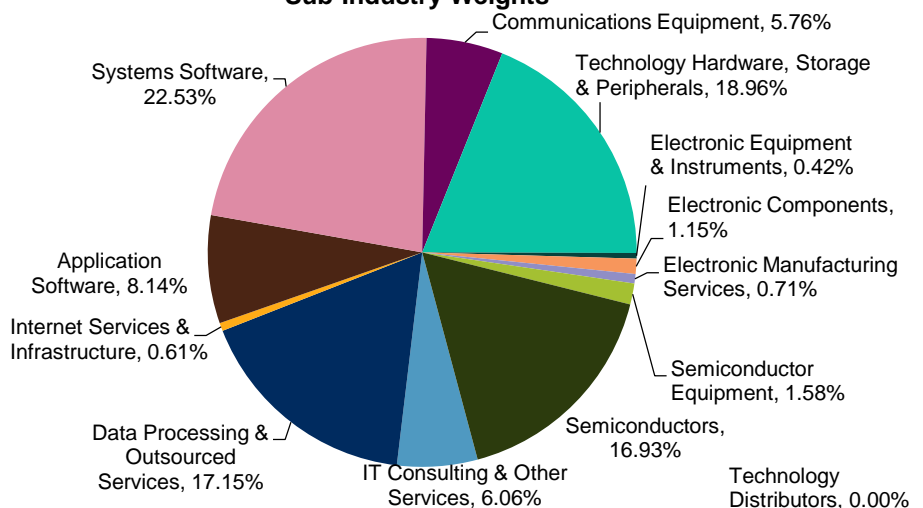
The two industries within Software & Services were the top weights in the sector, at 30.67% (Software) and 23.82% (IT Services).

Industry Weights



The Systems Software sub-industry accounted for 22.53% of the sector and includes companies such as Microsoft Corp and Oracle Corp.

Sub-Industry Weights



Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Charts are provided for illustrative purposes.

FUNDAMENTALS

From a fundamentals perspective, the Information Technology sector has carried higher price multiples and lower dividend yields when compared with the broader market (see Exhibit 5).

Exhibit 5: Fundamental Data Comparison

INDEX	12-MONTH TRAILING P/E	ONE-YEAR FORWARD P/E	PRICE-TO-BOOK VALUE	PRICE-TO-SALES RATIO	INDICATED DIVIDEND YIELD (%)
S&P 500	22.35	15.55	3.49	2.20	2.23
S&P 500 Information Technology Index	29.03	16.03	7.32	4.66	1.81
S&P MidCap 400	22.72	15.45	2.47	1.38	1.90
S&P MidCap 400 Information Technology Index	52.21	16.57	3.75	1.38	0.70
S&P SmallCap 600	43.03	17.11	2.30	1.09	1.76
S&P SmallCap 600 Information Technology Index	80.86	15.97	2.64	1.33	0.63

Source: S&P Dow Jones Indices LLC. Data for the one-year forward P/E and indicated dividend yield as of Dec. 31, 2018. Data for the 12-month trailing P/E and price-to-book and price-to-sales ratios as of Sept. 28, 2018. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

Related to the fundamental data above, the Information Technology sector tends to be tilted toward the growth factor. As of Dec. 31, 2018, S&P 500 Information Technology Index companies averaged 60% growth and 40% value. On average, large-cap Information Technology stocks were more strongly tilted toward growth than mid-cap or small-cap Information Technology stocks. The 10-year average was 67% growth and 33% value for Information Technology stocks in the S&P 500, 57% growth and 43% value in the S&P MidCap 400, and 50% growth and 50% value in the S&P SmallCap 600. Exhibit 6 shows how the growth and value tilts have changed over time.

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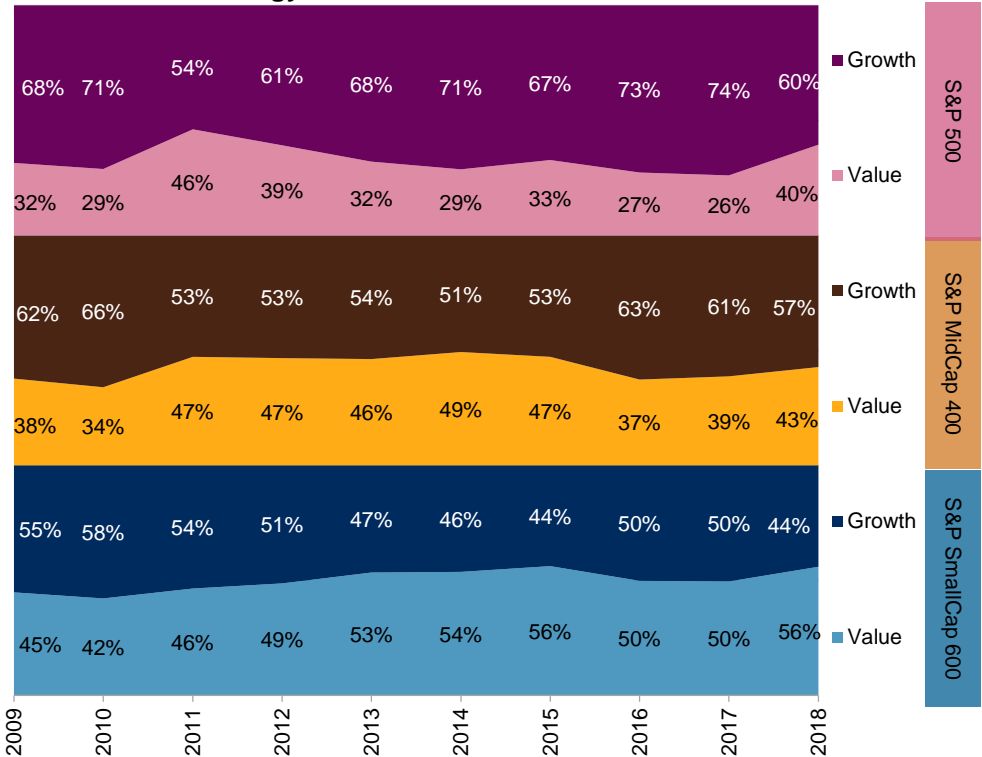
Exhibit 6: Growth and Value Factor Tilts of the Large-, Mid-, and Small-Cap Information Technology Sector

The 10-year average was 67% growth and 33% value for Information Technology stocks in the S&P 500...

...57% growth and 43% value for Information Technology stocks in the S&P MidCap 400...

...and 50% growth and 50% value for Information Technology stocks in the S&P SmallCap 600.

The S&P 500 Information Technology Index was the only sector to have a higher average ex-U.S. revenue exposure than domestic revenue exposure.

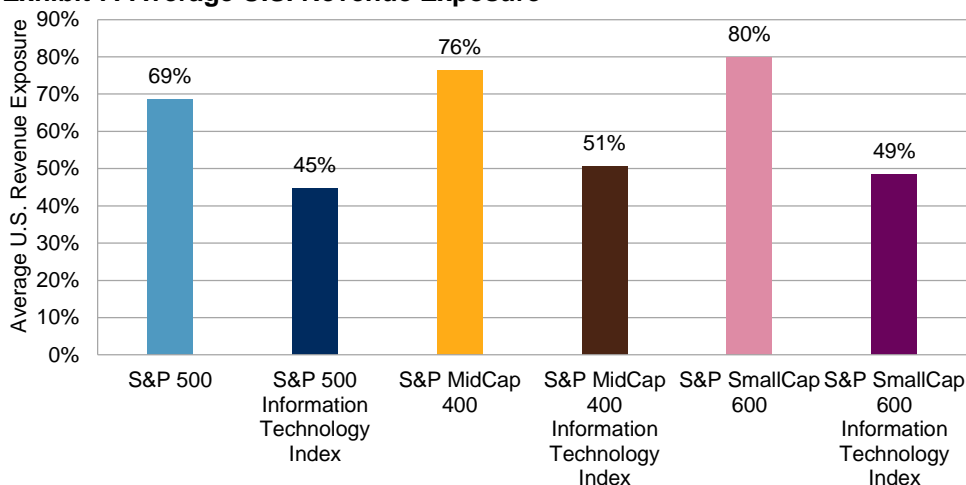


Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Chart is provided for illustrative purposes.

According to data from the FactSet Geographic Revenue Exposure (GeoRev™) database, Information Technology has been the only one of the 11 sectors of the S&P 500 that has had a higher average revenue exposure to regions outside the U.S. (greater than 50%) than domestic revenue exposure. Generally, if applying U.S. equities to get international exposure is a goal, large-cap companies do the most global business. However, the same higher average exposure to regions outside the U.S. has been true for S&P MidCap 400 and S&P SmallCap 600 Information Technology companies (see Exhibit 7).

Exhibit 7: Average U.S. Revenue Exposure

S&P MidCap 400 and S&P SmallCap 600 Information Technology companies have also had higher average exposure to regions outside the U.S.



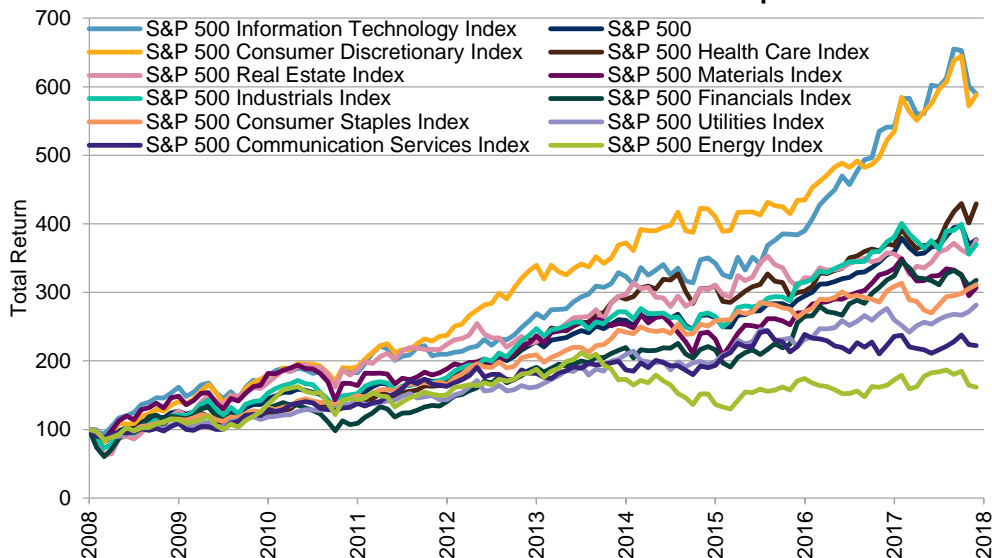
Source: S&P Dow Jones Indices LLC, FactSet GeoRev database. Data as of Dec. 31, 2018. Chart is provided for illustrative purposes.

PERFORMANCE

Over the past 10 years, Information Technology has been one of the top-performing GICS sectors. As the most heavily weighted sector in the S&P 500 over the 10-year period, a fair amount of the benchmark index’s performance can be attributed to these companies. As of Dec. 31, 2018, Information Technology’s 10-year annualized total return of 18.36% was the highest of any sector (see Exhibit 8). Also, on an annualized risk-adjusted total return basis, the S&P 500 Information Technology Index offered the best ratio of all the S&P 500 Sector Indices over the 3-, 5-, and 10-year periods (see Exhibit 9).

As the most heavily weighted sector in the S&P 500, a fair amount of the performance of the benchmark index’s performance can be attributed to Information Technology companies.

Exhibit 8: S&P 500 Sector Indices 10-Year Total Return Comparison



Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Indices rebased to 100 on Dec. 31, 2008. Performance based on total return in USD. Past performance is no guarantee of future results. Chart is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Exhibit 9: Annualized Returns of S&P 500 Sector Indices

INDEX NAME	1-YEAR	3-YEAR	5-YEAR	10-YEAR
ANNUALIZED RETURN (%)				
S&P 500 Information Technology Index	-0.29	16.37	14.93	18.36
S&P 500	-4.38	9.26	8.49	13.12
S&P 500 Communication Services Index	-12.53	2.17	2.58	7.51
S&P 500 Consumer Discretionary Index	0.83	9.55	9.69	18.35
S&P 500 Consumer Staples Index	-8.38	3.09	6.26	10.96
S&P 500 Energy Index	-18.10	1.07	-5.56	3.50
S&P 500 Financials Index	-13.03	9.28	8.16	10.92
S&P 500 Health Care Index	6.47	8.14	11.12	14.65
S&P 500 Industrials Index	-13.29	7.65	5.95	12.68
S&P 500 Materials Index	-14.70	7.22	3.84	11.07
S&P 500 Real Estate Index	-2.22	3.87	8.84	13.28
S&P 500 Utilities Index	4.11	10.72	10.74	10.46
RISK				
S&P 500 Information Technology Index	18.65	15.29	14.53	16.10
S&P 500	15.33	10.95	10.94	13.60
S&P 500 Communication Services Index	13.60	15.90	14.40	14.54
S&P 500 Consumer Discretionary Index	19.89	13.58	13.69	16.54
S&P 500 Consumer Staples Index	15.13	11.39	11.35	11.32
S&P 500 Energy Index	23.75	18.71	18.95	19.33
S&P 500 Financials Index	16.57	16.46	14.69	21.95
S&P 500 Health Care Index	18.47	13.69	13.06	13.33
S&P 500 Industrials Index	20.11	14.59	13.53	18.11
S&P 500 Materials Index	15.36	14.51	15.34	19.50
S&P 500 Real Estate Index	14.46	13.01	13.08	21.48
S&P 500 Utilities Index	9.80	12.39	12.78	12.62
ANNUALIZED RISK-ADJUSTED RETURNS				
S&P 500 Information Technology Index	-0.02	1.07	1.03	1.14
S&P 500	-0.29	0.85	0.78	0.96
S&P 500 Communication Services Index	-0.92	0.14	0.18	0.52
S&P 500 Consumer Discretionary Index	0.04	0.70	0.71	1.11
S&P 500 Consumer Staples Index	-0.55	0.27	0.55	0.97
S&P 500 Energy Index	-0.76	0.06	-0.29	0.18
S&P 500 Financials Index	-0.79	0.56	0.56	0.50
S&P 500 Health Care Index	0.35	0.59	0.85	1.10
S&P 500 Industrials Index	-0.66	0.52	0.44	0.70
S&P 500 Materials Index	-0.96	0.50	0.25	0.57
S&P 500 Real Estate Index	-0.15	0.30	0.68	0.62
S&P 500 Utilities Index	0.42	0.86	0.84	0.83

As of Dec. 31, 2018, the 18.36% 10-year annualized total return of the S&P 500 Information Technology Index was the highest of any sector.

The S&P 500 Information Technology Index offered the best risk-adjusted returns of all the sector indices over the 3-, 5-, and 10-year periods.

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Risk is defined as standard deviation calculated based on total returns using monthly values. Performance based on total return in USD. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

Within the sector indices, the S&P 500 Information Technology was most highly correlated with the S&P 500 Consumer Discretionary...

The Information Technology sector has been most highly correlated with Consumer Discretionary and least correlated with Utilities. Exhibit 10 shows that as of Dec. 31, 2018, the S&P 500 Information Technology Index (TR) had a correlation of 0.82 with the S&P 500 Consumer Discretionary Index (TR) based on five years of monthly returns. The correlation was 0.23 with the S&P 500 Utilities Index (TR). Correlation with other major country indices also varied. Of the 12 indices tested outside of the U.S., the S&P 500 Information Technology Index was most highly correlated with the S&P Germany BMI (0.76) and least correlated with the S&P Japan BMI (0.57).

...and least correlated with the S&P 500 Utilities.

S&P 500 SECTOR (TR)	CORRELATION	INDEX (TR)	CORRELATION
Consumer Discretionary	0.82	S&P Germany BMI	0.76
Materials	0.77	S&P Developed Ex-U.S. BMI	0.76
Industrials	0.75	S&P Global Ex-U.S. BMI	0.76
Financials	0.67	S&P United Kingdom BMI	0.72
Health Care	0.58	S&P France BMI	0.72
Energy	0.54	S&P Australia BMI	0.68
Real Estate	0.53	S&P Emerging BMI	0.67
Consumer Staples	0.51	S&P Korea BMI	0.66
Communication Services	0.32	S&P Canada BMI	0.65
Utilities	0.23	S&P China BMI	0.63
		S&P Switzerland BMI	0.62
		S&P Japan BMI	0.57
		S&P 500	0.87
		S&P United States BMI	0.86
		S&P Developed BMI	0.83
		S&P Global BMI	0.83
		S&P MidCap 400	0.79
		S&P SmallCap 600	0.73

In broader indices, the S&P 500 Information Technology was most correlated with the S&P Germany BMI...

Source: S&P Dow Jones Indices LLC. Correlations based on monthly total return data from January 2009 to December 2018. Past performance is no guarantee of future results. Table is provided for illustrative purposes and reflects hypothetical historical performance. Please see the Performance Disclosure at the end of this document for more information regarding the inherent limitations associated with back-tested performance.

....and least correlated with the S&P Japan BMI.

Within the Information Technology sector of the GICS structure, companies are bucketed into industry groups, industries, and sub-industries. These groupings, based on qualitative and quantitative factors, are increasingly more specific to the types of companies included. Due to this fact, performance of companies within the sector can vary. Exhibit 11 shows the annualized returns of the company groupings within the Information Technology sector.

Exhibit 11: Annualized Returns of the S&P 500 Information Technology Index GICS Sub-Indices (%)

INDEX	ANNUALIZED RETURN			
	1-YEAR	3-YEAR	5-YEAR	10-YEAR
S&P 500 Information Technology Index	-0.29	16.37	14.93	18.36
INDUSTRY GROUP				
S&P 500 Software & Services Index	4.27	16.07	15.33	18.92
S&P 500 Technology Hardware & Equipment Index	-2.71	17.18	13.61	17.31
S&P 500 Semiconductors & Semiconductor Equipment Index	-8.81	18.04	17.27	18.07
INDUSTRY				
S&P 500 IT Services Index	4.69	14.83	11.16	16.94
S&P 500 Communications Equipment Index	15.08	20.27	11.87	12.56
S&P 500 Software Index	17.69	22.55	20.63	19.34
S&P 500 Technology Hardware, Storage & Peripherals Index	-6.28	16.44	14.62	20.17
S&P 500 - Electronic Equipment, Instruments & Components Index	-12.50	13.79	11.07	13.32
S&P 500 Semiconductor & Semiconductor Equipment Index	-8.81	18.04	17.27	18.07
SUB-INDUSTRY				
S&P 500 IT Consulting & Other Services Index	-15.11	3.90	0.85	16.37
S&P 500 Data Processing & Outsourced Services Index	14.16	20.21	17.09	21.58
S&P 500 Internet Services & Infrastructure Index	-8.46	10.66	14.01	21.21
S&P 500 Application Software Index	24.83	25.75	22.58	24.56
S&P 500 Systems Software Index	16.38	21.88	19.73	18.31
S&P 500 Communications Equipment Index	15.08	20.27	11.87	12.56
S&P 500 Technology Hardware, Storage & Peripherals Index	-6.28	16.44	N/A	N/A
S&P 500 - Electronic Equipment & Instruments Index	3.14	20.88	11.08	12.28
S&P 500 -Electronic Components Index	-5.19	18.96	13.51	15.43
S&P 500 - Electronic Manufacturing Services Index	-25.05	4.79	7.14	18.07
S&P 500 Semiconductor Equipment Index	-28.00	19.93	16.67	16.59
S&P 500 Semiconductors Index	-6.38	17.76	17.31	18.23

Source: S&P Dow Jones Indices LLC. Data as of Dec. 31, 2018. Past performance is no guarantee of future results. Table is provided for illustrative purposes.

CONCLUSION

Information Technology is the largest of the 11 GICS sectors in the U.S. market. Because the S&P 500 is market capitalization weighted, this sector has the greatest influence on the index's price performance. The sector tends to tilt toward the growth factor and has had higher average revenue exposure to regions outside the U.S. compared with the other sectors. Information Technology has not only historically provided outperformance potential versus the broader benchmarks and against most of the other 10 sectors, but it also has shown a relatively attractive long-term annualized risk-adjusted return. Based on the sector's varying correlation with different sectors and countries, it can offer diversification and return potential.

The Information Technology sector has not only provided outperformance potential versus the broader benchmarks and other sectors...

...but it also has shown a relatively attractive long-term annualized risk-adjusted return.

Based on the sector's varying correlation to different sectors and countries, it can offer diversification and return potential.

PERFORMANCE DISCLOSURE

The S&P 500 Real Estate Index was launched September 19, 2016. The S&P 500 Internet Services & Infrastructure Index was launched September 21, 2018. The S&P 500 Technology Hardware, Storage & Peripherals Index was launched February 28, 2014. All information presented prior to an index's Launch Date is hypothetical (back-tested), not actual performance. The back-test calculations are based on the same methodology that was in effect on the index Launch Date. However, when creating back-tested history for periods of market anomalies or other periods that do not reflect the general current market environment, index methodology rules may be relaxed to capture a large enough universe of securities to simulate the target market the index is designed to measure or strategy the index is designed to capture. For example, market capitalization and liquidity thresholds may be reduced. Complete index methodology details are available at www.spdji.com. Past performance of the Index is not an indication of future results. Prospective application of the methodology used to construct the Index may not result in performance commensurate with the back-test returns shown.

S&P Dow Jones Indices defines various dates to assist our clients in providing transparency. The First Value Date is the first day for which there is a calculated value (either live or back-tested) for a given index. The Base Date is the date at which the Index is set at a fixed value for calculation purposes. The Launch Date designates the date upon which the values of an index are first considered live: index values provided for any date or time period prior to the index's Launch Date are considered back-tested. S&P Dow Jones Indices defines the Launch Date as the date by which the values of an index are known to have been released to the public, for example via the company's public website or its datafeed to external parties. For Dow Jones-branded indices introduced prior to May 31, 2013, the Launch Date (which prior to May 31, 2013, was termed "Date of introduction") is set at a date upon which no further changes were permitted to be made to the index methodology, but that may have been prior to the Index's public release date.

The back-test period does not necessarily correspond to the entire available history of the Index. Please refer to the methodology paper for the Index, available at www.spdji.com for more details about the index, including the manner in which it is rebalanced, the timing of such rebalancing, criteria for additions and deletions, as well as all index calculations.

Another limitation of using back-tested information is that the back-tested calculation is generally prepared with the benefit of hindsight. Back-tested information reflects the application of the index methodology and selection of index constituents in hindsight. No hypothetical record can completely account for the impact of financial risk in actual trading. For example, there are numerous factors related to the equities, fixed income, or commodities markets in general which cannot be, and have not been accounted for in the preparation of the index information set forth, all of which can affect actual performance.

The Index returns shown do not represent the results of actual trading of investable assets/securities. S&P Dow Jones Indices LLC maintains the Index and calculates the Index levels and performance shown or discussed, but does not manage actual assets. Index returns do not reflect payment of any sales charges or fees an investor may pay to purchase the securities underlying the Index or investment funds that are intended to track the performance of the Index. The imposition of these fees and charges would cause actual and back-tested performance of the securities/fund to be lower than the Index performance shown. As a simple example, if an index returned 10% on a US \$100,000 investment for a 12-month period (or US \$10,000) and an actual asset-based fee of 1.5% was imposed at the end of the period on the investment plus accrued interest (or US \$1,650), the net return would be 8.35% (or US \$8,350) for the year. Over a three year period, an annual 1.5% fee taken at year end with an assumed 10% return per year would result in a cumulative gross return of 33.10%, a total fee of US \$5,375, and a cumulative net return of 27.2% (or US \$27,200).

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