The Bishop Report
Performance and Forecast of the World Connector Industry

Issue No. 384 | 4h Quarter 2024 | October 2024

Bookings Up +8.7% in September and Sales up +5.1%

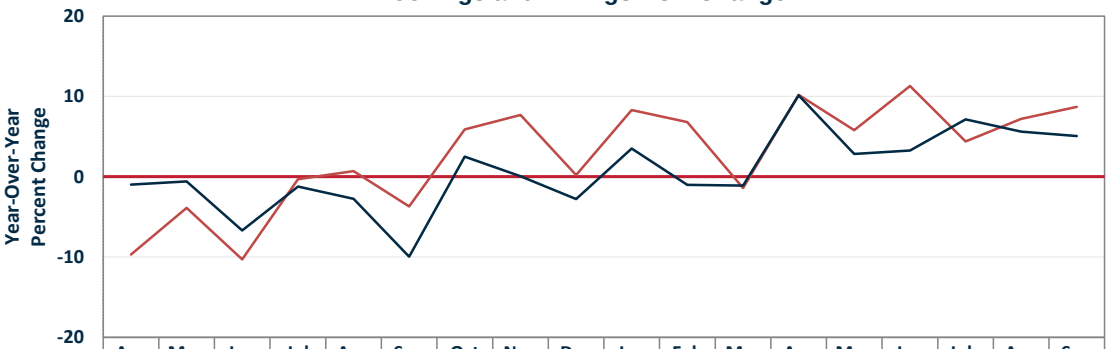
Regional Performance: YTD, all regions except Europe and Japan are showing growth, with the greatest growth in Asia Pacific, where YTD billings have increased +15.8%, followed by China where sales increased +10.7%. Japan and Europe, the only regions exhibiting a decline, have YTD billings of –16.8% and -2.9% respectively. See page 5.

Industry Backlog: September backlog was $21,459 million (11.4 weeks). See page 13.

2024 Currency Impact: The industry registered a YOY increase in sales in September 2024, of +1.7% in local currency and an increase in sales of +5.1% in USD.

September bookings increased +8.7% year-over-year and +6.7% year-to-date, while billings increased +5.1% year-over-year and +3.9% year-to-date.

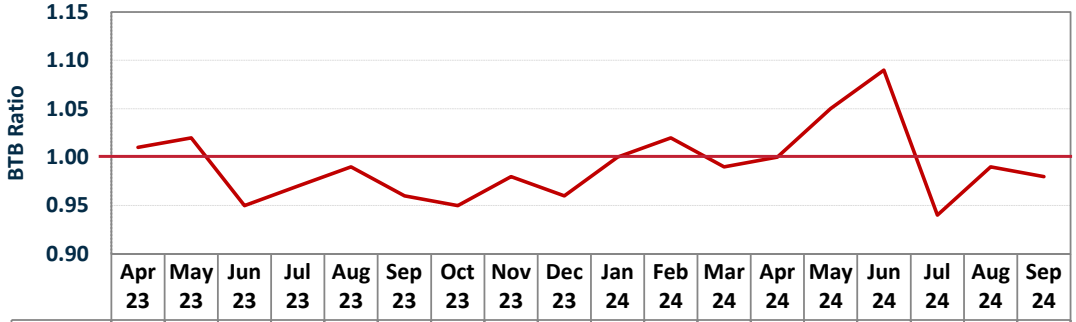
Bookings and Billings YOY Change



	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	July 24	Aug 24	Sep 24
Book	-9.7	-3.9	-10.3	-0.3	0.7	-3.7	5.9	7.7	0.2	8.3	6.8	-1.4	10.2	5.8	11.3	4.4	7.2	8.7
Bill	-1.0	-0.6	-6.7	-1.2	-2.8	-10.0	2.5	0.0	-2.8	3.5	-1.0	-1.1	10.1	2.8	3.3	7.1	5.6	5.1

The book-to-bill ratio in September was 0.98, down from 0.99 in August.

Connector Industry Book-to-Bill



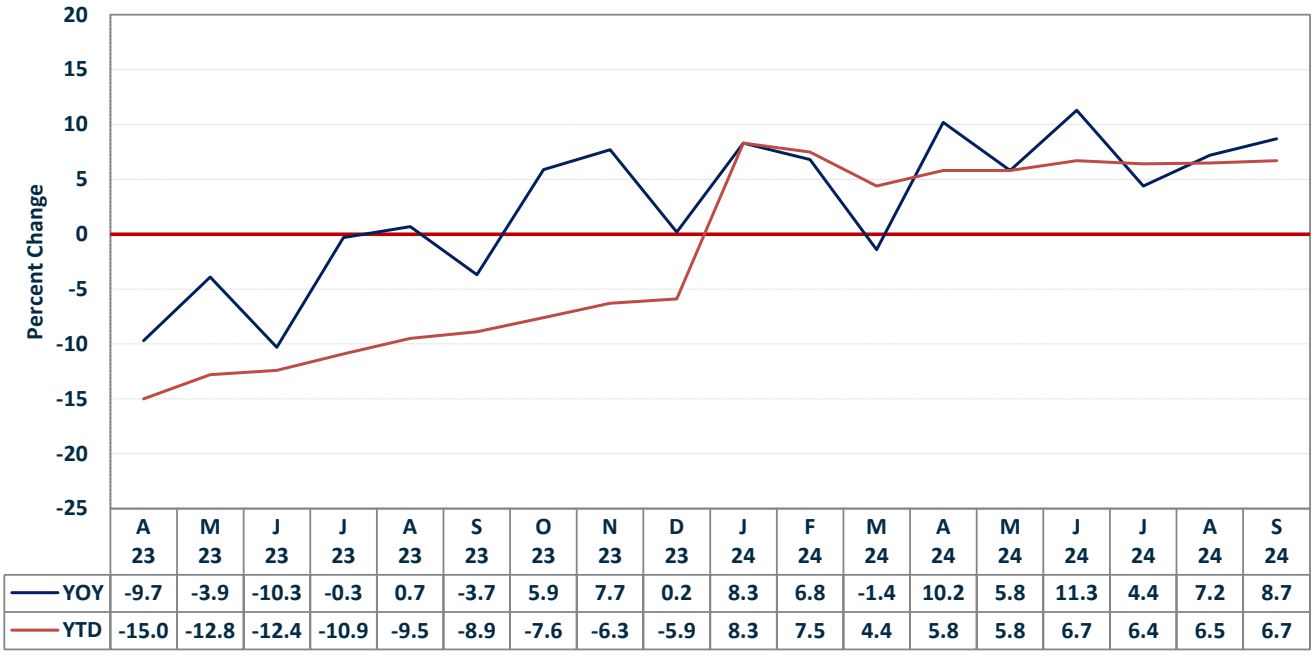
	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
BtB	1.01	1.02	0.95	0.97	0.99	0.96	0.95	0.98	0.96	1.00	1.02	0.99	1.00	1.05	1.09	0.94	0.99	0.98

Booking Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Bookings Percentage Change – 2022/2023/2024

	Sequential			Year-Over-Year			Year-To-Date		
Month	2022	2023	2024	2022	2023	2024	2022	2023	2024
Jan	1.6%	-1.3%	9.6%	14.8%	-18.4%	8.3%	14.8%	-18.4%	8.3%
Feb	10.0%	10.1%	5.1%	7.3%	-13.8%	6.8%	10.8%	-18.4%	7.5%
Mar	-5.1%	1.2%	-2.9%	7.1%	-12.9%	-1.4%	9.1%	-16.6%	4.4%
Apr	-8.5%	-5.1%	3.2%	-6.4%	-9.7%	10.2%	5.1%	-15.0%	5.8%
May	6.6%	13.5%	9.1%	-5.1%	-3.9%	5.8%	2.9%	-12.8%	5.8%
Jun	-6.5%	-12.7%	-6.8%	-3.2%	-10.3%	11.3%	1.9%	-12.4%	6.7%
Jul	-9.7%	0.3%	-5.8%	-9.9%	-0.3%	4.4%	1.1%	-10.9%	6.4%
Aug	8.2%	9.2%	11.6%	-9.6%	0.7%	7.2%	-1.2%	-9.5%	6.5%
Sep	-1.1%	-5.4%	-5.0%	1.6%	-3.7%	8.7%	-0.9%	-8.9%	6.7%
Oct	-12.0%	-3.2%		-16.3%	5.9%		-2.4%	-7.6%	
Nov	10.0%	11.8%		-15.9%	7.7%		-3.7%	-6.3%	
Dec	-7.2%	-13.7%		-16.1%	0.2%		-4.7%	-5.9%	

Bookings - YOY and YTD



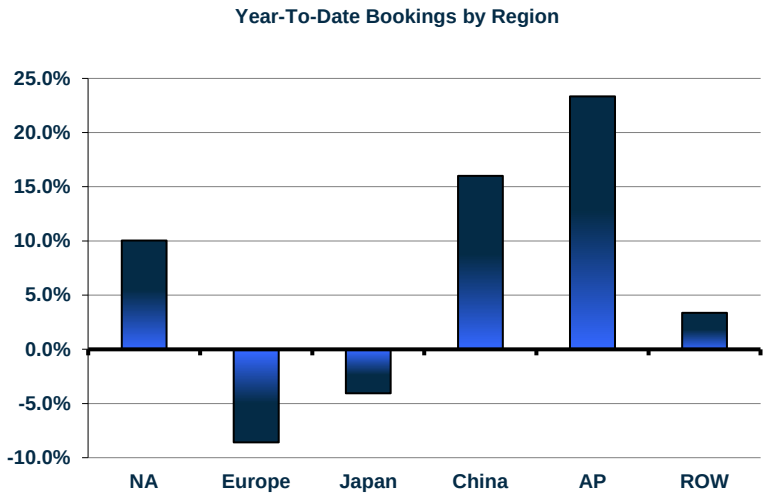
	A 23	M 23	J 23	J 23	A 23	S 23	O 23	N 23	D 23	J 24	F 24	M 24	A 24	M 24	J 24	J 24	A 24	S 24
YOY	-9.7	-3.9	-10.3	-0.3	0.7	-3.7	5.9	7.7	0.2	8.3	6.8	-1.4	10.2	5.8	11.3	4.4	7.2	8.7
YTD	-15.0	-12.8	-12.4	-10.9	-9.5	-8.9	-7.6	-6.3	-5.9	8.3	7.5	4.4	5.8	5.8	6.7	6.4	6.5	6.7

- September bookings increased +8.7% year-over-year.
- Orders decreased -5.0% on a sequential basis in September.
- The book-to-bill ratio for September was 0.98. This is down from August's book-to-bill of 0.99.

Regional Performance: BOOKINGS

September 2024 Bookings

Region	Sequential	YOY	YTD
NA	-10.1%	6.2%	10.0%
Europe	1.6%	-0.5%	-8.6%
Japan	4.2%	1.6%	-4.1%
China	-2.4%	15.1%	16.0%
AP	-7.5%	32.3%	23.3%
ROW	-19.8%	-5.3%	3.4%
Total	-5.0%	8.7%	6.7%



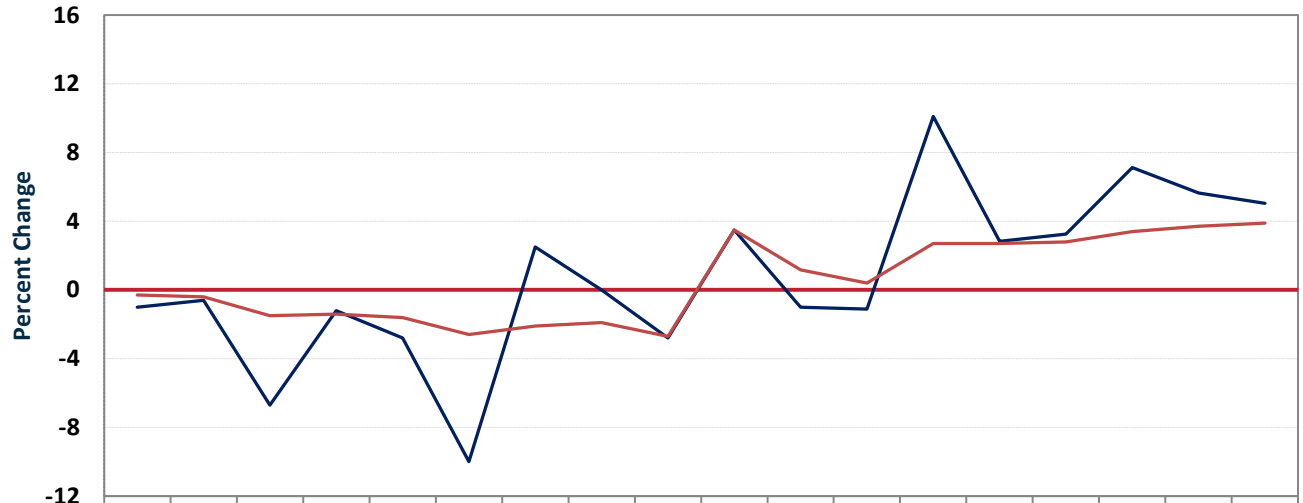
- Year-to-date, September bookings increased by +6.7%.
- Year-over-year orders in September rose in four of the six regions. North America, Japan, China, and Asia Pacific, saw increases with Asia Pacific showing the most growth at +32.3%, followed by China where bookings increased +15.1 YOY. Europe and the ROW showed a year-over-year decrease, with the ROW region declining the most at -5.3%, while European order declined -0.5%.
- YTD, similiar to August, all regions increased but Europe and Japan, where orders declined -8.6% and -4.1% respectively.

Billing Highlights and Conclusions

Sequential, Year-Over-Year, and Year-To-Date Billings Percentage Change – 2022/2023/2024

	Sequential			Year-Over-Year			Year-To-Date		
Month	2022	2023	2024	2022	2023	2024	2022	2023	2024
Jan	-5.1%	-3.1%	5.8%	11.4%	0.5%	3.5%	11.4%	0.5%	3.5%
Feb	11.4%	9.7%	2.8%	10.2%	-1.0%	-1.0%	10.8%	-0.3%	1.2%
Mar	-2.2%	-0.9%	0.4%	9.1%	0.3%	-1.1%	10.2%	-0.1%	0.4%
Apr	-6.7%	-7.9%	1.4%	3.0%	-1.0%	10.1%	8.4%	-0.3%	2.7%
May	11.6%	12.1%	4.4%	7.4%	-0.6%	2.8%	8.2%	-0.4%	2.7%
Jun	0.2%	-6.0%	-4.9%	11.9%	-6.7%	3.3%	8.8%	-1.5%	2.8%
Jul	-7.1%	-1.7%	1.8%	6.1%	-1.2%	7.1%	8.4%	-1.4%	3.4%
Aug	8.9%	7.2%	5.8%	6.3%	-2.8%	5.6%	8.1%	-1.6%	3.7%
Sep	5.1%	-2.7%	-3.0%	14.4%	-10.0%	5.1%	8.9%	-2.6%	3.9%
Oct	-14.0%	-2.1%		1.9%	2.5%		8.2%	-2.1%	
Nov	10.6%	7.9%		3.0%	0.0%		7.6%	-1.9%	
Dec	-9.8%	-12.4%		-1.6%	-2.8%		7.8%	-2.7%	

Billings - YOY and YTD



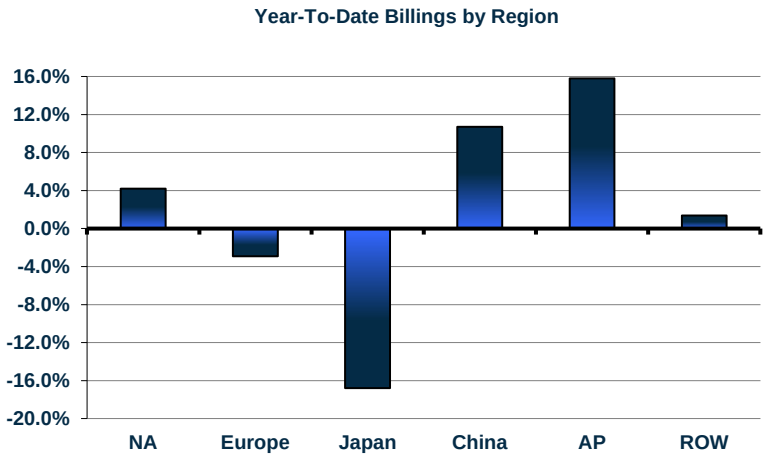
	A 23	M 23	J 23	J 23	A 23	S 23	O 23	N 23	D 23	J 24	F 24	M 24	A 24	M 24	J 24	J 24	A 24	S 24
YOY	-1.0	-0.6	-6.7	-1.2	-2.8	-10.	2.5	0.0	-2.8	3.5	-1.0	-1.1	10.1	2.8	3.3	7.1	5.6	5.1
YTD	-0.3	-0.4	-1.5	-1.4	-1.6	-2.6	-2.1	-1.9	-2.7	3.5	1.2	0.4	2.7	2.7	2.8	3.4	3.7	3.9

- September billings grew +3.9% year-to-date and +5.1% year-over-year.
- Sequentially, September billings decreased -3.0%.

Regional Performance: BILLINGS

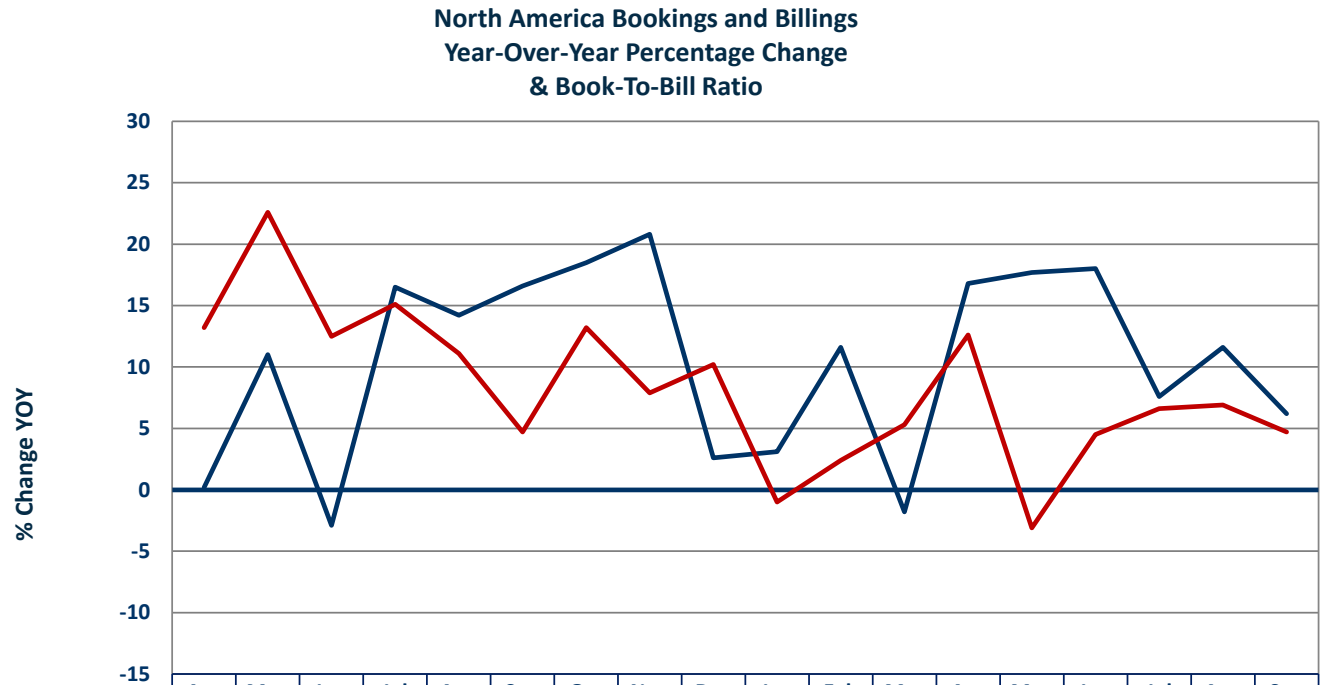
September 2024 Billings

Region	Sequential	YOY	YTD
NA	-7.0%	4.7%	4.2%
Europe	1.6%	-4.9%	-2.9%
Japan	-0.5%	-6.6%	-16.8%
China	-3.7%	11.0%	10.7%
AP	-0.4%	23.7%	15.8%
ROW	-0.5%	6.7%	1.4%
Total	-3.0%	5.1%	3.9%



- September connector sales increased by +5.1% compared to the same period last year.
- All regions saw a sequential decrease except Europe, where sales increased 1.6%. All other regions saw a decrease, with North America seeing the greatest decrease at -7.0%, folowed by China, where sales decreased -3.7% sequential.
- Year-over-year, four of the six regions saw an increase, with the greatest increase coming from the Asia Pacific region at +23.7%, followed by China with an +11.0% increase. Japan saw the greatest decrease, declining -6.6%, while Europe saw a decline of -4.9%. Japan has now had a monthly year-over-year decrease in billings for all nine months of 2024.
- YTD, all regions but Europe and Japan saw an increase, declining -2.9% and -16.8% respectively. Similiar to last month, the greatest growth YTD was in the Asia Pacific region, where sales grew +15.8%, followed by China, where sales grew +10.7%.

North America: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill (BTB) ratio is also displayed.



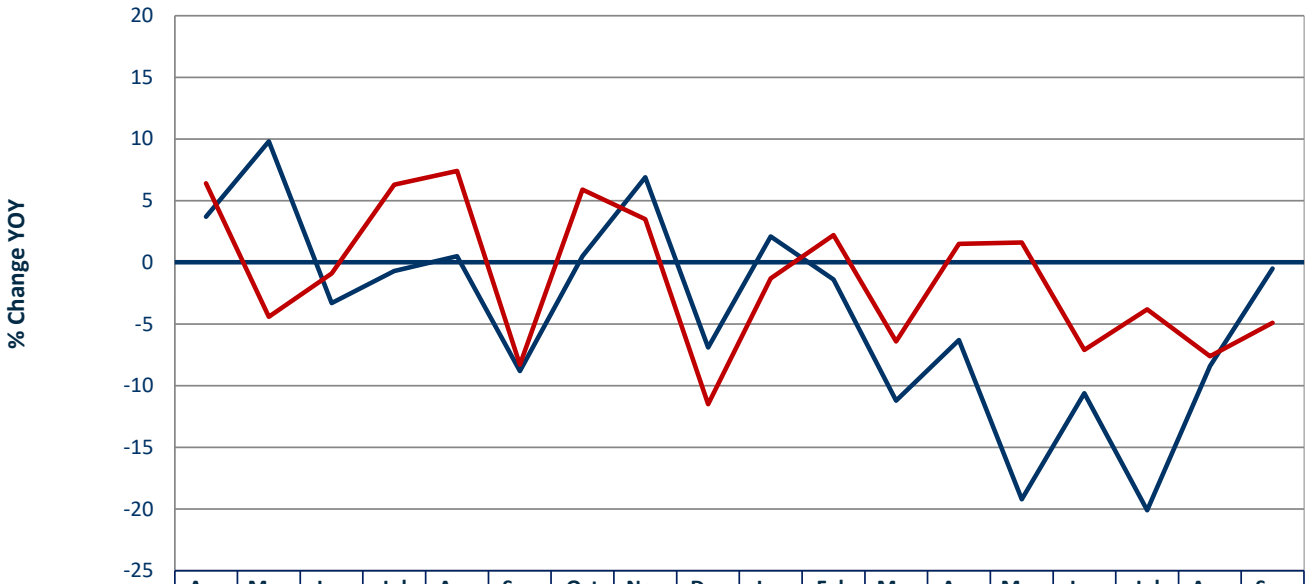
	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
Bookings	0.2	11.0	-2.9	16.5	14.2	16.6	18.5	20.8	2.6	3.1	11.6	-1.8	16.8	17.7	18.0	7.6	11.6	6.2
Billings	13.2	22.6	12.5	15.1	11.1	4.7	13.2	7.9	10.2	-1.0	2.4	5.3	12.6	-3.1	4.5	6.6	6.9	4.7
Billing SEQ	-6.5	23.3	-13.9	-1.6	8.8	-4.7	-6.9	4.3	-5.9	3.6	7.3	5.7	-1.4	3.5	-3.7	-0.9	9.4	-7.0
BTB	0.98	0.95	0.88	0.95	0.97	0.97	0.96	0.99	0.93	1.01	1.01	0.91	0.99	1.13	0.99	0.96	1.00	0.97

North America Performance

- Sales increased +4.7% year-over-year in North America in September, while orders grew +6.2%. Sequentially, North American billings decreased -7.0%. The book-to-bill ratio was 0.97.
- According to the Trading Economics, “the annual inflation rate in the US slowed for a sixth consecutive month to 2.4% in September 2024, the lowest since February 2021, from 2.5% in August.”
- Industrial production in the United States decreased 0.3% in September of 2024 after increasing 0.3% in August.
- Manufacturing PMI decreased to 47.3 points in September from 47.9 points in August 2024, the lowest reading since June of 2023.
- According to the US Bureau of Labor Statistics, the unemployment rate saw little change in September, coming in at 4.1%. September retail sales increased a seasonally adjusted 0.4%.
- According to MarkLine, preliminary September new vehicles sales were down 12.0% over September 2023, contributed by two days less than the same month last year.

Europe: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

Europe Bookings and Billings
Year-Over-Year Percentage Change
& Book-To-Bill Ratio



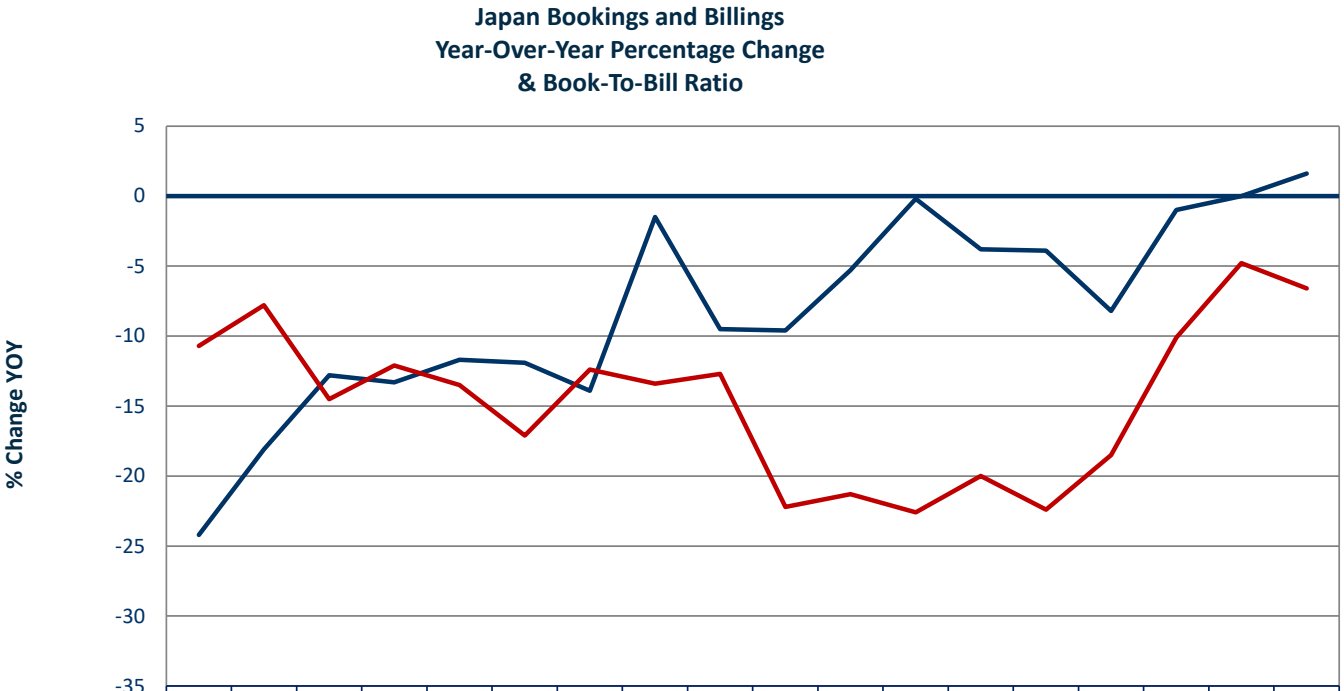
	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
Bookings	3.7	9.8	-3.3	-0.7	0.5	-8.8	0.5	6.9	-6.9	2.1	-1.4	-11.2	-6.3	-19.2	-10.6	-20.1	-8.4	-0.5
Billings	6.4	-4.4	-0.9	6.3	7.4	-8.3	5.9	3.5	-11.5	-1.3	2.2	-6.4	1.5	1.6	-7.1	-3.8	-7.6	-4.9
Billing SEQ	-7.1	4.1	0.7	-5.1	13.2	-3.1	-11.1	13.5	-23.6	22.2	12.6	-11.0	-1.4	4.5	-8.3	-2.3	7.7	1.6
BTB	1.07	1.21	0.99	0.96	0.90	0.86	0.91	1.00	1.04	1.02	0.95	1.00	0.99	0.96	0.97	0.81	0.92	0.92

Europe Performance

- Bookings decreased -0.5% year-over-year in September, while billings decreased -4.9%. Sequentially, sales increased +1.6%. The book-to-bill ratio was 0.92, same as August and up from 0.81 in July.
- According to Eurostat, seasonally adjusted industrial production increased by 0.1% in the euro area and by 0.2% in the EU when compared to August 2023.
- The annual inflation rate in the euro area declined to 1.7% in September, down from 2.2% in August. CPI in the euro area decreased to 126.6 points. Trading Economics reported the HCOB Eurozone Manufacturing PMI was revised slightly higher to 45 in September 2024 from a preliminary of 44.8.
- In August 2024*, compared with July 2024, the seasonally adjusted retail trade volume increased by 0.2% in the euro area and up by 0.3% in the EU, according to Eurostat.
- In August 2024*, the eurozone unemployment rate remained at 6.4% compared to 6.6% in August 2023.
- In September 2024, the Economic Sentiment Indicator (ESI) in the euro area was down to 96.2 from 96.5 in August.

**September readings not published at the time of this reporting.*

Japan: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.



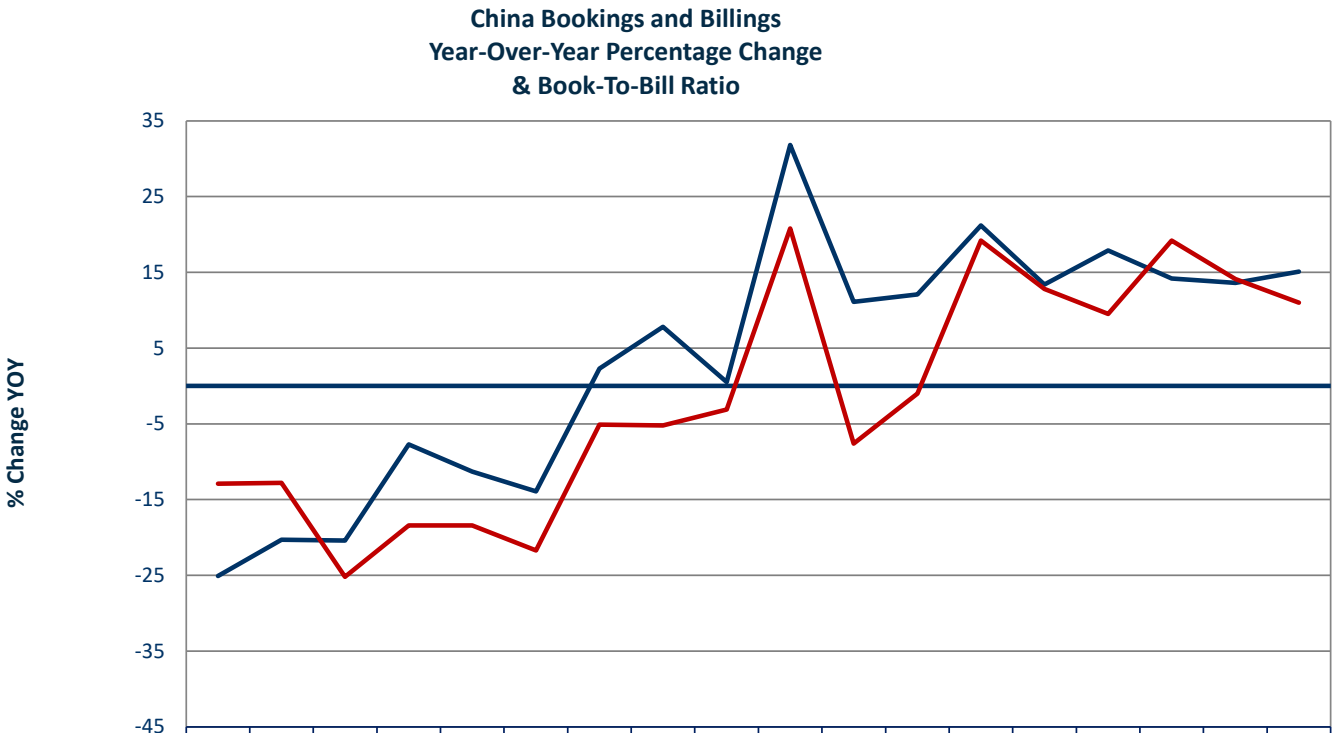
	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
Bookings	-24.2	-18.1	-12.8	-13.3	-11.7	-11.9	-13.9	-1.5	-9.5	-9.6	-5.3	-0.2	-3.8	-3.9	-8.2	-1.0	0.0	1.6
Billings	-10.7	-7.8	-14.5	-12.1	-13.5	-17.1	-12.4	-13.4	-12.7	-22.2	-21.3	-22.6	-20.0	-22.4	-18.5	-10.1	-4.8	-6.6
Billing SEQ	-2.1	3.1	-2.7	-7.1	-0.6	2.4	-2.7	6.8	-8.1	-17.1	11.9	-4.2	0.8	0.3	1.9	1.3	5.3	-0.5
BTB	0.93	0.93	1.01	1.01	1.01	1.02	0.98	1.06	1.02	0.90	0.95	1.26	1.17	1.20	1.01	1.07	1.04	1.08

Japan Performance

- September, year-over-year bookings grew +1.6%, while sales dropped -6.6%. Sequentially, sales decreased +-0.5%. Japan's book-to-bill ratio was 1.08, up from 1.04 in August.
- In September 2024, the core consumer price index (CPI) in Tokyo, Japan increased 2.0% year-on-year, breaking four straight months of acceleration in price growth and slowing sharply from 2.4% gain in August. Japan’s inflation rate in September 2024 was 2.5%.
- Industrial production growth in Japan declined by 3.3% month-over-month in August 2024*. This marked the fifth time of decrease so far this year. The au Jibun Bank Japan Manufacturing PMI was revised higher to 49.2 in October 2024, per Trading Economics.
- According to Trading Economics, "the core consumer price index for the Ku-area of Tokyo in Japan rose 2% year-on-year in September 2024, breaking four straight months of acceleration in price growth.“
- According to MarkLine, Japanese new vehicle sales in September increased 0.3% year-over-year to 438,733 units.

**September readings not published at the time of this reporting.*

China: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

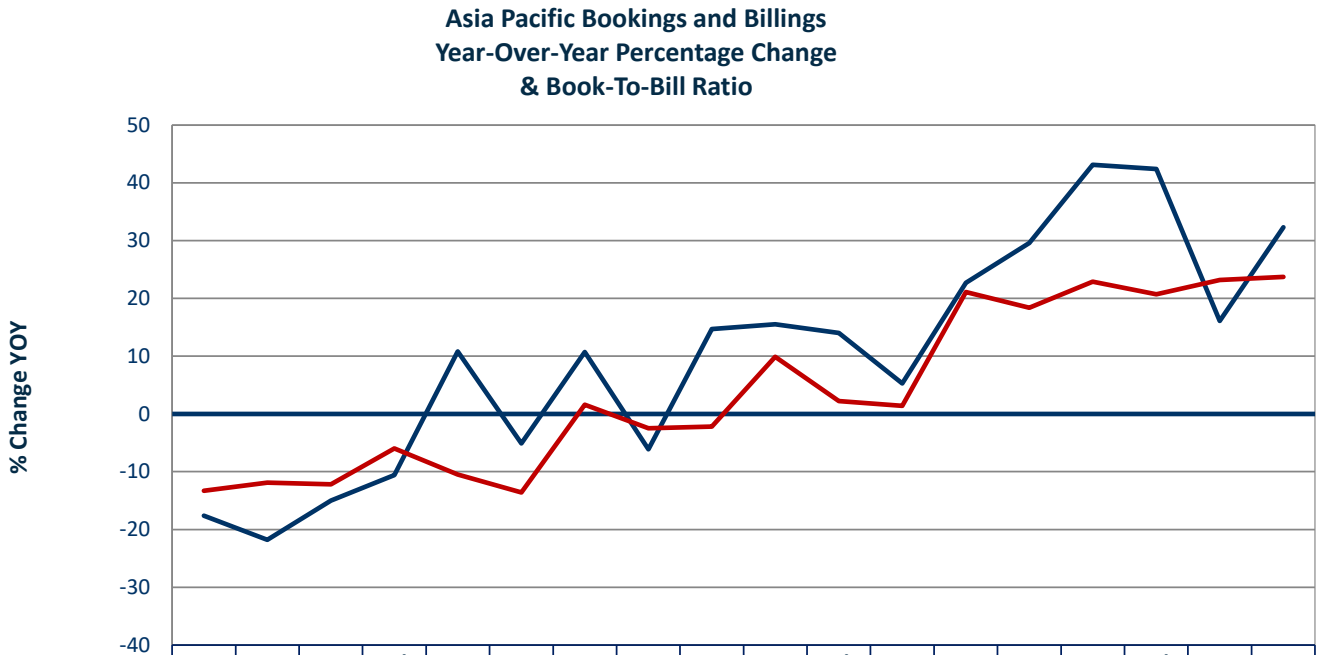


	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
Bookings	-25.1	-20.3	-20.4	-7.7	-11.3	-13.9	2.3	7.8	0.5	31.8	11.1	12.1	21.2	13.4	17.9	14.2	13.6	15.1
Billings	-12.9	-12.8	-25.2	-18.4	-18.4	-21.7	-5.1	-5.2	-3.1	20.8	-7.6	-1.0	19.2	12.8	9.5	19.2	14.1	11.0
Billing SEQ	-10.9	9.9	-3.6	2.0	5.2	-1.3	12.6	7.9	-10.8	-4.1	-14.0	10.1	7.2	4.9	-5.8	11.4	1.5	-3.7
BTB	0.97	0.98	1.00	1.06	1.08	1.06	0.95	0.97	0.91	0.96	1.11	1.04	1.00	1.01	1.08	1.00	1.06	1.07

China Performance

- China's September sales grew +11.0% on a year-over-year basis, while bookings increased 15.1%. Sequentially, sales decreased by -3.7%. The BTB increased to 1.07, from 1.06 in August.
- China's exports in September 2024 grew 2.4% from a year ago in US dollar terms, while imports rose by 0.3% according to CNBC
- In September 2024, China's annual inflation rate stood at 0.4% in September 2024, below market forecasts and August's figure of 0.6%. This was the 8th month of consumer inflation but was the lowest since June.
- According to Trading Economics, "China's industrial production grew by 5.4% year-over-year in September 2024, above forecasts of 4.6% and accelerating from August's five-month low of 4.5%."
- According to MarkLines, China's September vehicle production decreased 1.9% year-over-year, while sales volumes decreased 1.7% year-over-year. In September, vehicle production and sales volumes totaled 2.796 million units and 2.809 million respectively year-over-year.
- China's surveyed urban unemployment rate was 5.1% in September 2024, down from 5.3% in August. This is a 0.2 percentage point decrease from the same period in 2023,according to Trading Economics.

Asia Pacific: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.



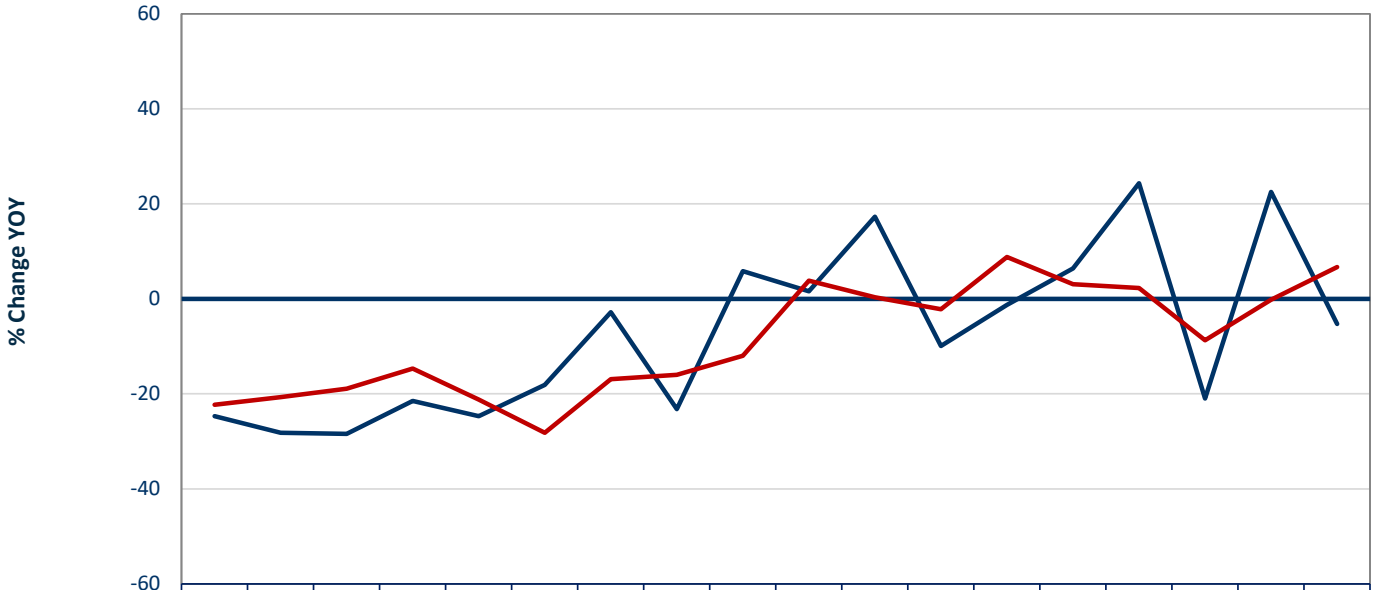
	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 24
Bookings	-17.6	-21.8	-15.0	-10.6	10.8	-5.1	10.7	-6.1	14.7	15.5	14.0	5.3	22.7	29.6	43.1	42.4	16.1	32.3
Billings	-13.3	-11.9	-12.2	-6.0	-10.5	-13.6	1.6	-2.5	-2.2	9.9	2.2	1.4	21.1	18.4	22.9	20.7	23.2	23.7
Billing SEQ	-9.3	8.9	-3.2	1.2	-1.8	0.7	4.4	5.2	-5.5	9.1	-3.1	0.0	9.2	6.1	-2.1	2.0	0.6	-0.4
BTB	1.02	0.94	0.91	0.82	1.06	0.92	0.95	0.93	0.96	0.95	1.01	1.01	1.03	1.04	1.06	1.00	0.98	0.91

Asia Pacific Performance

- Year-over-year, September orders were up a solid +32.3%, while billings increased +23.7%. Sequentially, sales decreased -0.4%. The book-to-bill ratio was 0.91, down from 0.98 in August.
- The HSBC India Manufacturing PMI declined to 56.5 in September 2024 from 57.5 in the previous month. This was the slowest expansion in factory activity since January 2024.
- India's retail inflation hit an nine month high of 5.49% on an annual basis in September, driven by a persistent rise in vegetable prices and a lower year-ago base, according to The Economic Times.
- According to Trading Economics, the S&P Global South Korea Manufacturing PMI dropped sharply to 48.3 in September 2024 from 51.9 in August, marking the lowest reading since June 2023.
- South Korea's adjusted unemployment rate rose slightly to 2.5% in September from a one-year low of 2.4% in August according to Trading Economics.

Rest of World: The following chart displays the year-over-year percentage change in bookings and billings for the last 18 months. The monthly book-to-bill ratio is also displayed.

ROW Bookings and Billings
Year-Over-Year Percentage Change
& Book-To-Bill Ratio



	Apr 23	May 23	Jun 23	Jul 23	Aug 23	Sep 23	Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24	Apr 24	May 24	Jun 24	Jul 24	Aug 24	Sep 23
Bookings	-24.7	-28.2	-28.4	-21.5	-24.7	-18.1	-2.8	-23.2	5.8	1.6	17.3	-9.9	-1.3	6.4	24.3	-21.0	22.5	-5.3
Billings	-22.3	-20.7	-18.9	-14.7	-21.2	-28.2	-16.9	-16.0	-12.0	3.8	0.3	-2.2	8.8	3.1	2.3	-8.7	-0.2	6.7
Billing SEQ	-11.3	15.1	-4.4	2.9	1.3	-7.0	2.3	8.6	-7.2	-3.2	10.3	-4.7	-1.1	8.8	-5.1	-8.2	10.6	-0.5
BTB	1.07	0.96	0.89	1.02	0.88	0.98	1.03	0.86	1.06	1.05	1.24	0.97	0.96	0.99	1.07	0.88	1.08	0.87

Rest of World Performance

- Orders decreased -5.3% after increasing +22.5 in August, while billings increased +6.7% year-over-year. Sequentially, sales decreased by -0.5%. The book-to-bill ratio was 0.87, down significantly from August, when the book-to-bill hit a high of 1.08. It has appeared over the last five months, bookings and billings are on a perpetual roller coaster.
- “Brazil's annual inflation rate was 4.42% in September 2024. This was up from 4.24% in the previous month, and in line with market expectations”, according to Trading Economics.
- According to Trading Economics, “The S&P Global Brazil Manufacturing PMI rose to 53.2 in September 2024 from 50.4 in August, signaling a solid recovery in the sector after a brief slowdown.”
- According to Trading Economics, “Brazil’s unemployment rate averaged 6.6% in the three months to August of 2024, below market expectations of 6.7%, and dropping sharply from the 7.1% rate from the moving quarter ending in May”. It was also the lowest reading since 2014.

**September readings not published at the time of this reporting.*

Regional Summary Snapshot

The following table shows a snapshot of the performance of each region. The table displays the latest metric available, and the trend of the metric compared to prior months/quarters.

	North America	Europe	Japan	China	Asia Pacific	ROW
GDP Growth YOY	2.8% Declining	0.8% Steady	0.7% Down	4.6% Growing	N/A	N/A
Industrial Production Growth	-0.2% Down	0.1% Up	-3.3% Down	5.4% Down	N/A	N/A
Manufacturing PMI*	47.3 Down	45.0 Steady	49.2 Up	49.8 Up	N/A	N/A
Inflation Rate	2.4% Down	1.7% Down	2.5% Up	0.4% Down	N/A	N/A
Unemployment Rate	4.1% Steady	6.4% Steady	2.4% Steady	5.1% Steady	N/A	N/A
Retail Sales Growth YOY	0.4% Down	0.2% Up	4.2% Up	3.2% Up	N/A	N/A
Sept. Connector Sales	4.7%	-4.9%	-6.6%	11.0%	23.7%	6.7%
YTD Connector Sales	4.2%	-2.9%	-16.8%	10.7%	15.8%	1.4%
Sept. Connector Orders	6.2%	-0.5%	1.6%	15.1%	32.3%	-5.3%
YTD Connector Orders	10.0%	-8.6%	-4.1%	16.0%	23.3%	3.4%

* Purchasing Manager Index - Below 50 is contracting factory activity

The Industry Backlog Is 11.4 Weeks

The industry shipped $1,875 million per week in September. As the table below displays, in September the ending backlog is $21,459. Assuming the industry's weekly sales of $1,875 million remain constant, the backlog represents 11.4 weeks of sales.

The following table shows the world connector backlog of orders ending September 2024.

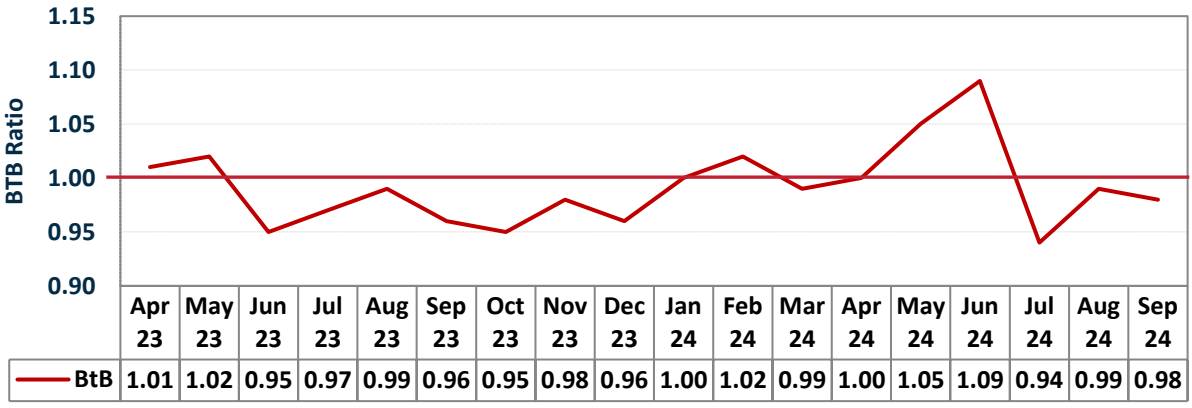
Industry Backlog

	2023	September 2024
BtB Ratio	0.98	0.98
Beginning Backlog	$22,983	$21,017
YTD Bookings	$79,888	$65,058
YTD Billings	$81,854	$64,616
Ending Backlog	$21,017	$21,459
Backlog in Weeks	13.4	11.4

$ Millions

The book-to-bill ratio in September was 0.98. The following displays the trend of BTB ratios since April of 2023.

Connector Industry Book-to-Bill



The September 2024 ending backlog of $21,459 million is $442 million more than the 2023 ending backlog of $21,017 million.

Change in Backlog

2023 Ending Backlog	$21,017
2024 September Ending Backlog	$21,459
Backlog Growth	$442

$ Millions

Currency Fluctuations Reduce Performance between USD and Local Currency

The dollar has been fluctuating against the euro, the yen, and the yuan. The following table measures the impact for September 2023 versus September 2024 and shows results for these three currencies.

Local Currency to One USD
2023 YTD versus 2024 YTD

Currency	2023	2024	% Change
Euro	0.9358	0.9003	3.9%
Yuan	7.2800	7.0760	2.9%
Yen	147.6775	143.1461	3.2%

Europe, China, and Japan account for approximately 60% of world connector sales. Currency fluctuation against the US dollar can have a significant impact on our reporting of sales performance in US dollars.

The following table shows September YOY performance by region in US dollars and local currencies.

Industry Sales Performance
September 2024
USD-vs-Local Currencies

Region	U.S.$	Local Currency
North America	4.7%	4.7%
Europe	-4.9%	3.9%
Japan	-6.6%	3.2%
China	11.0%	2.9%
Asia Pacific	23.7%	23.7%
ROW	6.7%	6.7%
World	**5.1%**	**1.7%**

Connector sales in September of 2024 increased +1.7% when measured in local currencies, versus an increase of +5.1% in US dollars.

2024 Outlook: YTD September

Over the past decade, year-to-date sales in September averaged 74.6% of full year sales. Our global connector sales through September are $64,616 million. Historically, on average, 2024 full year connector sales will be $86,617 million ($64,616 divided by 74.6%).

Since we shipped $81,854 million in 2023, sales growth would be +5.8% ($86,617 divided by $81,854) in 2024.

Using the historical forecasting methodology, we can estimate a range of possible outcomes for connector sales in 2024.

2024 Historical Analysis
Through September 2024

	Historical Percentage	Sales YTD September	2024 Forecast
Low	70.3%	$64,616	$91,915
Medium	74.6%	$64,616	$86,617
High	77.9%	$64,616	$83,054

$ Millions

The following table shows the range of possible outcomes using this methodology. Note, we also include the Bishop forecast is this table.

2024 Forecast Range

	2024 Forecast	2023 Actual	Percent Growth
Low	$91,915	$81,854	12.3%
Bishop	$86,602	$81,854	5.8%
Medium	$86,617	$81,854	5.8%
High	$83,054	$81,854	1.5%

$ Millions

The Bishop forecast of 5.8% exactly matches the historical average of 5.8%. September bookings were up +8.7% year-over-year and up +6.7% year-to-date. That is encouraging and suggests we might end the year with sales up slightly more than the +5.8% forecast. However, we are not witnessing a big uptick in connector demand.

The following table provides Bishop & Associates' 2024 forecast by geographic region versus actual year-to-date results through September 2024.

2024 Bishop Forecast

Region	2024F	YOY Percent Change	September YTD
North America	$20,313.5	7.8%	4.2%
Europe	$18,582.6	3.3%	-2.9%
Japan	$4,822.2	3.0%	-16.8%
China	$26,606.2	6.5%	10.7%
Asia Pacific	$12,113.2	7.1%	15.8%
ROW	$4,164.1	2.8%	1.4%
Total World	**$86,601.8**	**5.8%**	**3.9%**

$ Millions

Our year-over-year forecast is for growth of 5.8% in 2024. While year-to-date September sales are only up +3.9%, we believe the fourth quarter will be strong and push full year 2024 sales up to +5.8% or slightly higher.

Note, the connector industry achieved sales in 3Q24 of $22,353, up +6.1% in US dollars compared to 3Q23. We anticipate the fourth quarter to be up a strong 7.3% leading to a year-over-year growth of 5.8%.

The following table shows industry sales by quarter for 2022, 2023, and 2024.

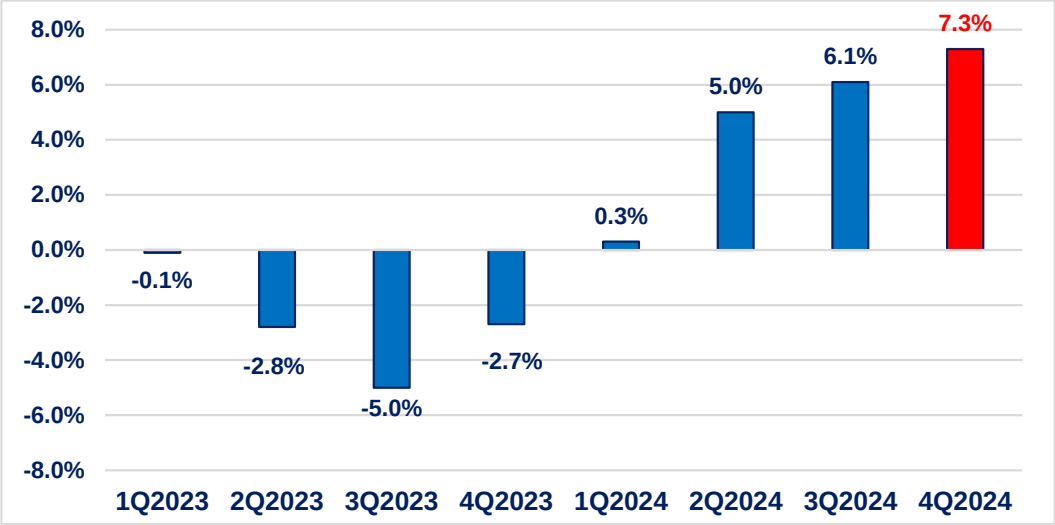
Connector Industry Quarterly Sales Results/Forecast
2022, 2023, and 2024

Quarter	2022 Actual	2023 Actual	YOY Change	2024 Actual	YOY Change
1Q	$21,200	$21,179	-0.1%	$21,253	0.3%
2Q	$20,560	$19,981	-2.8%	$20,982	5.0%
3Q	$22,160	$21,060	-5.0%	$22,353	6.1%
4Q	$20,171	$19,634	-2.7%	**$21,067**	**7.3%**
Total	**$84,091**	**$81,854**	**-2.7%**	**$86,602**	**5.8%**

$ Millions, Bishop & Associates © 2024, Forecast in Red

We are starting to see some improvement in connector demand, as shown in the following table which indicates future and past quarterly results.

Quarterly Sales by Percent Change
2023 through 2024



Note: Forecast represented in red.

Significant Events

October 2024 News

Industry News

LUXSHARE's Subsidiary Acquires LEONI's Automotive Cable Solutions Division

Automotive wiring harness manufacturer Leoni AG signed a share purchase agreement with China's Luxshare Precision on September 17. According to the agreement, Luxshare Precision will acquire 50.1% of Leoni Group's shares and 100% of its wholly owned subsidiary Leoni Kabel (referred to as 'Leoni K') for 525.41 million euros.

Leoni is a wholly owned subsidiary of L2-Beteiligungs, registered in Nuremberg, Germany. It mainly operates two core businesses: the Automotive Cable Systems Division (ACS) and the Wiring Systems Division (WSD). The Automotive Cable Systems Division is operated by Leoni's wholly owned subsidiary Leoni K, while the Wiring Systems Division is operated by another wholly owned subsidiary, Leoni Bordnetze Systeme (referred to as 'Leoni B'). Leoni B also owns four subsidiaries, which will be transferred to Leoni K before the equity transfer to ensure the smooth progress of the transaction.

According to the agreement, Luxshare Precision will acquire 100% equity of Leoni K through its subsidiary for 320 million euros and will acquire 50.1% equity of Leoni for 205.41 million euros, with the remaining 49.9% equity continuing to be held by L2-Beteiligungs. Upon completion of the transaction, Leoni and Leoni K will be included in Luxshare Precision's consolidated financial statements.

This acquisition marks another important move for Luxshare Precision in its automotive business layout. As one of Apple's core suppliers, Luxshare Precision has been increasing its investment in the automotive sector in recent years, beyond its consumer electronics business such as smartphones, in order to create new growth curves. According to its medium to long-term goals, Luxshare Precision plans to become a global Tier 1 leading manufacturer of automotive parts within the 'three five-year' periods.

North American EMS Industry Shipments Up 10.3 Percent in September

IPC announced today the September 2024 findings from its North American Electronics Manufacturing Services (EMS) Statistical Program. The book-to-bill ratio stands at 1.26.

Total North American EMS shipments in September 2024 were up 10.3 percent compared to the same month last year. Compared to the preceding month, September shipments up 2.0 percent.
EMS bookings in September increased 19.6 percent year-over-year and decreased 10.8 percent from the previous month.

"The North American EMS book-to-bill ratio remains near the midpoint for the year, underscoring stable demand within the sector," said Shawn DuBravac, IPC's chief economist. "While September orders reflect a dip from the previous month, they indicate sustained resilience in bookings."

Hon Hai's Revenue Surges, Driven by AI

IPhone assembler Hon Hai Precision Industry Co reported its highest-ever quarterly sales for the third quarter on the back of solid global demand for artificial intelligence (AI) servers.

Hon Hai, also known as Foxconn Technology Group, said it posted NT$1.85 trillion (US$57.93 billion) in consolidated sales in the July-to-September quarter, up 19.46 percent from the previous quarter and up 20.15 percent from a year earlier.

The figure beat the previous third-quarter high of NT$1.74 trillion recorded in 2022, company data showed.

Due to rising demand for AI, Hon Hai said its cloud and networking division enjoyed strong sales growth on a year-on-year and quarter-on-quarter basis in the third quarter. Sales in its electronics component division also rose significantly on the back of an increase in critical component and automotive component shipments, the company said. The computing division reported solid year-on-year sales growth in the third quarter due to the debut of new products, but sales stayed little changed from a quarter earlier, it said. The company's smart consumer electronics division reported robust quarter-on-quarter sales growth as new products hit the market but stayed flat from a year earlier, it added.

In the first nine months of this year, Hon Hai's consolidated sales rose by 9.73 percent from a year earlier to NT$4.73 trillion. The world's largest contract electronics maker expects sales momentum to accelerate this quarter, because of peak season effects in the global information and communications technology industry, it said.

Global Smartphone Shipment Forecast, 2025 and Beyond

DIGITIMES Research, by synthesizing supply chain information, regional market conditions, and analyzing global political and economic trends, forecasts that global smartphone shipments will reach 1,181.4 million units in 2024, marking a growth of 4.9%.

Looking ahead over the next five years, there is an anticipated demand for feature phone users in regions such as India, Southeast Asia, Latin America, and Africa to upgrade to smartphones, while the ongoing deployment and expansion of 5G networks in these markets are expected to further drive their smartphone shipments. DIGITIMES Research estimates that the global annual shipment growth rate will range between 3% and 4%, with a compound annual growth rate (CAGR) of 3.6%.

With the period of high inflation and US dollar appreciation having passed and purchasing power across different regions gradually recovering, it is projected that the global smartphone market will continue to ramp up in 2025, following the same trend in 2024, with an estimated growth rate of 3.6%. Shipments are expected to reach 1,223.9 million units.

Global PC Shipments Dip Slightly Despite Recovery Economy, AI Integration Key to Future Market Success

Even though the global economy shows signs of recovery, worldwide shipments of traditional PCs dipped 2.4% year-over-year (YoY) to 68.8 million units, during the third quarter of 2024 (3Q24), according to preliminary results from the International Data Corporation. Factors including rising costs and inventory replenishment led to a surge in shipments in the previous quarter, resulting in a slightly slower sales cycle.

Commercial demand outside the education sector also remained strong as many businesses have begun to refresh their PCs in preparation for the end of support for Windows 10. Key markets such as Japan grew

double digits during 3Q24 and is leading this transition, but IDC expects other markets to follow suit in the coming quarters. Meanwhile, Apple had a strong 1H24 and YoY comparison base before its new products are expected to launch.

Gartner Says Worldwide PC Shipments Declined 1.3% in Third Quarter of 2024

Worldwide PC shipments totaled 62.9 million units in the third quarter of 2024, a 1.3% decline from the third quarter of 2023, according to preliminary results by Gartner, Inc. This decline comes after three consecutive quarters of year-over-year growth for the PC market.

Notebook Market Struggles

Compal, the world's second-largest notebook ODM, reported flat sales in September, traditionally a peak season for the electronics industry, indicating a lackluster notebook market. As the second-largest notebook ODM globally after Quanta, Compal holds a 16% share of the notebook shipment market, manufacturing devices for brands like Lenovo, HP, and Dell, according to *DIGITIMES Research*.

The notebook supply chain lacked seasonal momentum in the latter half of 2024, prompting some component suppliers to hope for a potential demand uptick during the traditionally slow period in 2025. However, ODMs remain cautious, with most indicating that they have yet to confirm market conditions for the first quarter of 2025.

Suppliers in the notebook industry have mixed opinions about the first quarter of 2025. Some predict that the weak performance during the 2024 peak season will lead to an even slower off-season early in 2025. Others are more optimistic, suggesting that an anticipated upgrade cycle could commence as early as the first quarter, potentially lessening the traditional off-season's impact. Nevertheless, many agree that the current market outlook remains uncertain and challenging to assess.

Manufacturing Stabilized in September

US manufacturing remained in contraction in September, but factory activity stabilized, new orders ticked up slightly and prices paid for inputs hit a nine-month low. Combined with falling interest rates, the environment has improved for a manufacturing recovery.

The Institute for Supply Management’s PMI remained unchanged from August at a level of 47.2. Any reading above 50.0 indicates expansion. New orders ticked up by 1.5 percent to 46.1 and the prices index declined by 5.7 percent to 48.3.

Gartner Forecasts 85 million Electric Vehicles Will Be on the Road by End of 2025

By the end of 2025, 85 million electric vehicles (EVs) - cars, buses, vans and heavy trucks – are expected to be on the road, according to the latest forecast by Gartner, Inc.

“Despite several hurdles affecting the EV market over the past few months, we are projecting the number of EVs in use globally to total 64 million units in 2024 and increase 33% in 2025,” said Jonathan Davenport, Sr Director Analyst at Gartner. “Many companies overestimated how quickly the switch to EVs would occur. This caused those companies to delay launching new EV models. The growth in 2025 will be driven primarily by higher EV sales in China (58%) and Europe (24%), which together are projected to represent 82% of total EVs in use worldwide.”

Globally, battery electric vehicles (BEVs) in use are forecast to total almost 62 million units by the end of 2025, an increase of 35% from 2024. Plug-in hybrid electric vehicles (PHEVs) are expected to grow at a slightly slower rate and reach an installed base of 23 million units in 2025, up 28% from 2024.

Regionally, the ownership of EVs in China is projected to continue to dwarf the rest of the world's combined installed base through 2025 and likely the next decade. Demand for EVs will steadily grow in Europe and North America, which is projected to account for 36% of global EVs in 2024. By 2025, Gartner estimates 49 million EVs will be on the road in China, compared to 20.6 million EVs in Europe and 10.4 million EVs in North America.

Smart Home Market on Track for Rebound Thanks to Emerging Regions

Global shipments of smart home devices are set to stall once again in 2024 as volume remains flat with 0.6% growth to 892.3 million devices, according to the International Data Corporation. High penetration and long refresh cycles in mature markets such as the US have curbed growth though worldwide shipments are set to return to growth in 2025 on the backs of emerging markets, driving unit shipments to grow 4.4% to 931.1 million units.

Home monitoring and security products such as connected cameras, door locks, and doorbells are quickly rising to the top, representing over a quarter of the volume throughout the forecast.

Rather unfortunately, smart speakers which helped jumpstart the smart home market, are now expected to decline 8.8% in 2024 before returning to a very mild 0.7% growth in 2025. The smart speaker category is in some ways reverting to simplicity as its greatest selling point – fewer frivolous displays, fewer cameras, and simplified voice input as Google, Amazon, and others eventually bring their latest conversational AI to these speakers.

AI is also expected to be a selling point for other categories such as Smart Vacuums which have seen an immense rise in recent years thanks to a flood of new brands and an increased number of price points.

Looking ahead, IDC estimates the smart home market to growth with a compound annual growth rate (CAGR) of 5.6% between 2024 and 2028, amounting to 1.1 billion units shipped in the final year. Emerging markets, the continued proliferation of AI, and a refresh cycle amongst mature categories such as TVs are expected to add to the growth.

IDC Finds Global Gaming PC Market Recovered in Q2 2024

At approximately 10.6 million units shipped, gaming PCs saw a modest year-over-year recovery of 2.4% in the second quarter of 2024 (2Q24). Despite economic uncertainty that continues to affect key markets like China, inventory replenishment and favorable comparisons against a rough 2023 led to the first positive quarter since the first quarter of 2022. At the same time, gaming monitor growth remained robust in 2Q24. Monitor shipments reached nearly 6.5 million units and grew 35% year-over-year as promotions and aggressive upstart vendors fueled the fifth consecutive quarter of year-over-year gaming monitor growth, according to the International Data Corporation (IDC) Worldwide Quarterly Gaming Tracker.

IDC forecasts the gaming market for PCs and monitors will recover in 2024, after unit contractions in both 2022 and 2023. Gaming volume is expected to hit 69.3 million in 2024, or 9% higher than 2023. Gaming desktops, a key segment for high-end gaming and monitors, is expected to recover in 2025 as new GPUs land in stores. Gaming penetration is also expected to take an increased share going forward, with gaming taking 20% of the total PC and Monitor market by 2028.

Gartner Forecasts Worldwide Shipments of AI PCs to Account for 43% of All PCs in 2025

Worldwide shipments of AI PCs are projected to total 114 million units in 2025, an increase of 165.5% from 2024, according to a new forecast from Gartner, Inc.

Gartner defines AI PCs as a PC with an embedded neural processing unit (NPU) and uses this classification for the forecast. AI PCs include PCs with NPUs attached to Windows on Arm, macOS on Arm and x86 on Windows PCs.

Gartner forecasts AI PC shipments to reach 43 million units in 2024, a 99.8% increase from 2023. Gartner forecasts AI PCs will represent 43% of all PC shipments by 2025, up from 17% in 2024. The demand for AI laptops is projected to be higher than that of AI desktops, with shipments of AI laptops to account for 51% of total laptops in 2025. Gartner predicts that by 2026, AI laptops will be the only choice of laptop available to large businesses, up from less than 5% in 2023.

IDC Forecasts Continued Growth for Wearables but Growth Will Be Uneven Across Product Categories

Worldwide wearable device shipments are forecast to grow 6.1% year over year in 2024 to 537.9 million units according to new data from the International Data Corporation (IDC). An improving global economy combined with a refresh cycle in mature markets and continued adoption in emerging regions will help drive volumes forward. However, growth will be uneven across the various form factors.

Hearables, representing over 60% of the wearables market, are expected to be driven by further proliferation among emerging markets and the beginning of a refresh cycle in mature markets as consumers look to replace pandemic-era purchases.

Smartwatches are expected to face the first ever year-over-year decline (-3%) in 2024 before rebounding to 4.8% growth in 2025. Despite the decline, it's not time to sound alarm bells just yet as the reduction is largely driven by India, which has been a global driver for low-cost smartwatches in recent years. The smartwatch market within the country has been plagued by a flood of white-label products and is expected to see some consolidation in the short term. Excluding India, the global market for smartwatches is forecast to grow 9.9%. Meanwhile, ASPs for smartwatches are expected to rise by 5.7% in 2024.

Among the other form factors, rings and smart glasses without a display are also expected to grow as more brands join the race. Meta's partnership with Ray-Ban has proven to be quite successful, which has led to the rise of fast-follower brands flooding online marketplaces with low-cost versions. Meanwhile, smart rings are largely expected to maintain their premium status as the category is still led by a select few brands.

TSMC Expects 13% Revenue Growth in 4Q24

TSMC has disclosed that its third-quarter revenue and margins surpassed the guidance it provided three months ago. The pure-play foundry anticipates a 13% sequential increase in revenue in US dollar terms at the midpoint for the fourth quarter.

TSMC expects to post revenue of between US$26.1 billion and US$26.9 billion in the fourth quarter of 2024, indicating a 35% year-on-year surge at the midpoint. Gross margin and operating margin for the quarter are estimated at 57-59% and 46.5-48.5%, respectively.

TSMC reported net revenue climbed 39% year-on-year to NT$759.69 billion for the third quarter of 2024. The revenue in US dollar terms increased by 12.9% sequentially and by 36% from the previous year, reaching US$23.5 billion. The sales figures exceeded the guidance range of US$22.4 billion to US$23.2 billion.

TSMC's gross margin came to 57.8% in the third quarter of 2024, up 4.6% sequentially, primarily thanks to a higher capacity utilization rate and cost improvement efforts. Given a higher gross margin, operating margin improved 5.0% sequentially to 47.5%. Both margins topped the upper limit of guidance.

TSMC reported net earnings of NT$325.26 billion in the third quarter of 2024, representing a 31.2% increase from the second quarter and a 54.2% rise from the third quarter of 2023. The net profit margin was 42.8%, and the diluted EPS was NT$12.54.

Strong 3nm and 5nm chip demand

TSMC's revenue increased 12.8% quarter-on-quarter in the third quarter, driven by strong smartphone and AI demand for both 3nm and 5nm technologies. By technology, 3nm process technology accounted for 20% of total wafer revenue in the third quarter, up from 15% in the previous quarter and 6% in the third quarter of 2023.

Advanced technologies (7nm and below) generated 69% of TSMC's overall wafer revenue in the third quarter of 2024.

By platform, HPC and Smartphone represented 51% and 34% of net revenue respectively, while IoT, Automotive, DCE, and Others each represented 7%, 5%, 1%, and 2%, according to TSMC. The HPC segment climbed from 42% as a proportion of revenue during the same period in 2023.

TSMC indicated that third-quarter revenue from HPC, Smartphones, IoT, Automotive, and Others increased 11%, 16%, 35%, 6%, and 8% respectively, quarter-on-quarter, while DCE decreased 19%.
In the third quarter of 2024, revenue from customers based in North America accounted for 71% of TSMC's total net revenue from a geographic perspective. Revenue from China, Asia Pacific, Japan, and EMEA (Europe, Middle East, and Africa) accounted for 11%, 10%, 5%, and 3% of total net revenue, respectively.

China’s Exports Miss Forecasts, But Continue Growing

Beijing has tried to bolster growth through fiscal stimulus packages and is to issue special bonds to bolster banks to shore up the property market

China’s exports rose much less than expected last month, curbing a trade rebound that has been a bright spot for the slowing economy.

Exports climbed just 2.4 percent in US dollar terms from a year earlier, while imports inched up 0.3 percent, the Chinese General Administration of Customs said yesterday. That left a trade surplus of US$81.71 billion for the month.

Economists had forecast that exports would rise 6 percent, while imports would expand 0.8 percent.

Chinese exports have been a rare source of strong growth for the economy this year, with the total value of shipments through last month the second highest on record. However, imports have not grown as fast due to the slowdown in domestic growth, causing a record trade surplus and prompting more countries to raise barriers to Chinese goods.

Beijing has sought to bolster growth with a slew of stimulus measures, which could lift demand for imports and put pressure on prices to rise. The domestic economy has been in deflation since the second quarter of last year, which has pushed down export prices.

China has relied on manufacturing and exports to propel growth as the property sector slump hit consumer sentiment, with officials last week announcing plans for a significant fiscal stimulus package.

Massive Lithium Reserve Discovered in Arkansas Could Power Global EV Industry

Researchers have uncovered an enormous lithium deposit in southwestern Arkansas – a discovery that has the potential to remake the electric vehicle industry and bolster the US' position in the clean energy race.

A joint study led by the US Geological Survey (USGS) and the Arkansas Department of Energy and Environment's Office of the State Geologist found an estimated 5 to 19 million tons of lithium reserves beneath the state. It is a staggering amount that could meet the projected 2030 world demand for lithium in car batteries nine times over.

The lithium reserves are located in the Smackover Formation, a remnant of an ancient sea that stretches across several southern states. This porous limestone geological unit, dating back to the Jurassic period, is already known for its oil and bromine deposits and is now poised to become a key player in the lithium market.

Lithium is essential for battery production, particularly in electric vehicles, and the demand for lithium has skyrocketed in recent years. The United States currently relies on imports for more than 25 percent of its lithium needs.

EV Battery Prices Set to Plummet; Dramatic 50% Drop Predicted by 2026

Green if true: Advances in technology and reductions in the cost of battery metals will soon bring electric vehicles to price parity with traditional cars, according to Goldman Sachs. However, this forecast overlooks current issues with oversupply, environmental impact, and China's export restrictions on rare-earth elements.

Goldman Sachs is highly optimistic about the future of electric vehicle batteries. The financial giant recently released new research focused on EV batteries, predicting that battery prices will drop by nearly 50 percent within the next few years. The technology is advancing much faster than initially anticipated.

The EV market is currently experiencing a phase of apparent oversupply, which might seem like bad news for battery tech. However, Goldman Sachs Research is forecasting a resurgence in consumer demand that will "largely begin" by 2026.

Global average prices for EV batteries have already seen a decline, falling from $153 per kilowatt-hour (kWh) in 2020 to $149 in 2023. This year, prices are expected to drop further to $111 per kWh, and by 2026, they are projected to reach just $80. In two years, EV batteries will cost nearly 50 percent less than they did in 2023, bringing electric vehicles to ownership cost parity with gasoline-powered vehicles in the US – and that's before factoring in subsidies.

Why Big Tech is Turning to Nuclear to Power its Energy Intensive AI Ambitions

Technology giants are turning to nuclear energy to power the energy-intensive data centers needed to train and run the massive artificial intelligence models behind today’s generative AI applications.

Microsoft and Google are among the firms agreeing deals to purchase nuclear power from certain suppliers in the U.S. to bring additional energy capacity online for its data centers.

Google said it would purchase power from Kairos Power, a developer of small modular reactors, to help "deliver on the progress of AI."

Google said its first nuclear reactor from Kairos Power would be online by 2030, with more reactors going live through 2035.

The tech giant isn't the only firm looking to nuclear power to realize its AI ambitions. Last month, Microsoft signed a deal with U.S. energy firm Constellation to resurrect a defunct reactor at the Three Mile Island nuclear power plant in Pennsylvania, whose reactor has been dormant for five years.

Meanwhile, not to be outdone, Amazon announced its own mega investment in nuclear, a $500 million deal with Dominion Energy to explore the development of a small modular nuclear reactor near the utility company's North Anna nuclear power station.

Global electricity consumption from data centers, artificial intelligence and the cryptocurrency sector is expected to double from an estimated 460 terawatt-hours (TWh) in 2022 to more than 1,000 TWh in 2026, according to a research report from the International Energy Agency.

Researchers at the University of California, Riverside, published a study in April last year that found ChatGPT consumes 500 milliliters of water for every 10 to 50 prompts, depending on when and where the AI model is deployed. That equates to roughly the amount of water in a standard 16-ounce bottle.

Scientists Invented a Powder that Can Suck Carbon Dioxide from the Air

The fight against climate change may have found a new secret weapon in the form of a carbon-capturing powder that is capable of sucking up and storing as much carbon dioxide as a fully-grown tree.

Attempts to remove carbon from the air have been popping up all around the scientific community, especially as the climate change crisis continues to get worse. However, most of these carbon-removal techniques are still in the early design phase or just aren't efficient enough to actually balance out the emissions we're putting out.

With trees' ability to remove carbon slowly dwindling as they become too full, scientists have continued to look for other methods to alleviate one of humanity's worst greenhouse gas emissions. This carbon-capturing powder could very well be our first real chance at balancing things out.

The powder is a porous material that can adsorb carbon dioxide as the air passes through it. And no, "adsorb" isn't a misspelling. While some materials *absorb* things, this powder actually *adsorbs* the carbon dioxide, keeping its molecules trapped on the surface instead of becoming soaked by them.

This means that the carbon-capturing powder can work even more effectively because it isn't becoming soaked with carbon dioxide like trees and other removal methods. Instead, absorbing means that you can then release it somewhere else, allowing you to clean the air and store the CO2 in a place where it won't be released back into the atmosphere.

To test the efficiency of the powder, the researchers placed some of it in a tube and then passed air from Berkely through it. They found that it was able to capture 100 percent of the carbon dioxide from the air. The

researchers say that the powder breaks new ground in the fight against climate change and that there's nothing else like it out there at the moment. A paper on these findings is published in the journal *Nature*.

Apple Explains Why its Approach to AI Photo Editing is Different From Rivals: Accuracy Over Fantasy

One of the many questions being raised about AI-packed smartphones relates to their ability to edit photos. At what point, for example, does an image become so altered that it no longer qualifies as a photograph? It's something Apple is well aware of, which is why Cupertino wants its editing tool to offer a more realistic result than those of its rivals.

Apple's suite of artificial intelligence tools, aptly called Apple Intelligence, finally arrives on compatible devices with the launch of the iOS 18.1 update on October 28.

One of the new features of Apple Intelligence is Clean Up, a tool in the Photos app that can remove people and objects from images.

Apple's Senior Vice President of Software Engineering, Craig Federighi, sat down with The Wall Street Journal's Joanna Stern for an interview about Apple Intelligence. At one point, the reporter demos Clean Up, showing how objects such as a water bottle can be edited out of a photo.

Stern then notes how some of Apple's rivals such as Samsung and Google offer more extensive AI tools that generate parts of photos. She uses the addition of a lion and an explosion created by Google Reimagine as an example. Apple doesn't allow users to add their own content to images.

When asked about Apple's contrasting approach, Federighi's bottom line was "We help purvey accurate information, not fantasy."

Even Apple's Image Playground, which allows users to create images using concepts like themes, costumes, accessories, and places, has certain limitations.

"When you look at experiences like Image Playground, we made sure that the images we were generating were not photorealistic," Federighi said. "Not because the underlying model couldn't generate something photorealistic but because we never wanted someone to have any confusion of whether Joanna was really wearing that fuzzy hat?"

Some companies offering AI tools identify images as being altered in the metadata. Apple does it with those edited using Clean Up, and it also tags them in the Photos app as "Modified with Clean Up."

Why the Mate XT Ultimate Design is a Big Deal

The Mate XT Ultimate Design has a 10.2-inch screen when fully unfolded, similar to the size of an iPad. When unfolded, it also sets a record as the slimmest foldable phone ever made, at just 3.6 millimeters thick. Additionally, it can be opened in dual mode, offering a screen size of around 8 inches -- comparable to book-style foldables like Google's Pixel 9 Pro Fold.

To achieve the technical feat of a dual-folding screen, Huawei developed a hinge system that uses two tracks which work in tandem to enable both inward and outward folds. The phone has widely been referred to as a trifold phone, which is misleading. In reality, it only folds in two places, transforming its large screen into three slim mini panels. Currently, it retails in China for a starting price of $2,800, converted from 19,999 yuan.

Huawei began selling it on Sept. 20, the same day the iPhone 16 series launched in its first wave of countries and regions, including China.

The Mate XT Ultimate Design isn't likely to drive major sales for Huawei due to its steep price tag. However, the launch of a Huawei-made triple-screen phone symbolizes the company's innovation and progress in the smartphone category, despite US sanctions, marking a symbolic victory for the brand.

Starting in 2019, the Chinese tech giant's phone business faced crippling US sanctions, which nearly decimated Huawei's smartphone division. Those sanctions blocked access to advanced American technology essential for smartphone semiconductors, and key software, making the company's phones less appealing in the global marketplace.

Today, Huawei's smartphone business is thriving once again, boosted by support from the national government. In fact, Huawei is the number one foldable phones company in the world, according to research firm International Data Corporation. In the first half of 2024, Huawei claimed 26% of the global market share, while Samsung secured 23% with its popular Galaxy Z Fold and Galaxy Z Flip series.

Winning the foldables race remains a key ambition for Huawei. The worldwide foldables market is forecast to reach 25 million devices by the end of 2024, up 37.6% from the 18.1 million units shipped in 2023, according to IDC. By 2028, total foldable phone shipments worldwide are expected to rise to 45.7 million units, per IDC, representing a compounded annual growth rate of 20.3% for 2023 to 2028.

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Huawei Reveals Harmony OS NEXT, China's First Fully Homegrown Mobile Operating System

Chinese tech giant Huawei announced the official launch of HarmonyOS NEXT at a launch event on October 22. The HarmonyOS Next is the 5.0 version of Huawei's self-developed mobile operating system (OS) HarmonyOS and is the first iteration to be built independent of the Android architecture.

At the event, Huawei executive director Richard Yu revealed the latest progress of the Harmony ecosystem, stating that the HarmonyOS now has been installed in over 1 billion devices and has 6.75 million registered developers. In the first quarter of 2024, HarmonyOS surpassed Apple's iOS to take the number two spot in the Chinese mobile OS market share.

The most crucial breakthrough of HarmonyOS Next is that it is now completely independent from the Android architecture. Previous iterations of the HarmonyOS had a system base that still utilized some codes from the Android Open Source Project (AOSP), so they had to be compatible with some Android applications.

Now, with HarmonyOS NEXT having its own operating kernel, programming language, AI framework, and other features that were developed without using the Linux kernel or AOSP, Huawei can develop a fully domestic ecosystem. With deep integration of software, hardware, and cloud, the Huawei Ark Engine was able to have a full upgrade, reducing memory by 1.5G, improving overall performance by 20%, and increasing battery life by nearly an hour.

Richard Yu stated at the event that Huawei worked with more than 10,000 domestic partners to develop HarmonyOS NEXT apps. Media reports stated that there are more than 15,000 apps and meta-services launched on HarmonyOS NEXT, with general office apps covering more than 38 million enterprises across the country. Moreover, these apps are being upgraded at a rapid pace, with some receiving new updates daily.

This is the first time Huawei has integrated its proprietary AI into its operating system. Huawei's Celia virtual assistant, powered by PanguLM, has been significantly enhanced with improved perception and reasoning abilities. It now boasts a task success rate of over 90% and has a knowledge volume exceeding one trillion.

Researchers Are Reinventing Concrete Using 2,000-year-old secrets

Buildings built with concrete in ancient Rome continue to stand firm to this day. This has spurred many researchers to look for the key to Rome’s success with concrete in the early days, and we may have finally discovered a major breakthrough. See, ancient Roman concrete is much stronger than the modern stuff we use these days.

Modern concrete is mainly based on Portland cement—which was created in England in the 19th century. However, Portland cement isn’t nearly as strong as the stuff the ancient Romans used to use, and it also hurts the climate quite a bit thanks to the intensive and complex system used to create it, which is why engineers have tried to make concrete without cement in it.

Part of what sets ancient Roman concrete apart is its ability to heal itself. Unlike modern concrete, which is cheap and cracks over time, Roman concrete was much more resilient and has stood the test of time much better. However, we’ve never really been able to figure out exactly how they used to make it.

Sure, we’ve had a few ideas over the years, but one of those primary ideas—that clasts found in the samples we’ve collected over the years were mistakes—is currently being tested, as some scientists believe the “mistakes” may actually be part of the technology that made the entire thing work so well.

One of the biggest mysteries about ancient Roman concrete is how exactly they made it. We know that concrete derives its strength from a mixture we call calcium aluminate silicate hydrates, or CASH. But we don’t know how Romans combined it all to get that mixture.

The traditional theory is that they heated limestone—similarly to how Portland cement is made—and then combined that with water. This created a dangerously reactive material called calcium oxide—or quicklime, depending on who you are. When combined with the water, the calcium oxide becomes slaked lime or calcium hydroxide. Finally, they would add something like volcanic ash to supply the silicon and aluminum needed to complete the CASH formula.

It is the clasts that sometimes appear due to this mixture that scientists believe were “bad workmanship.” However, some researchers believe the opposite—that these deposits were likely the source of the ancient Roman concrete’s self-healing ability. Considering we have seen new types of self-healing concrete popping up, we know that it is entirely possible.

History of M & A in the Connector Industry

Shrinking Footprints: Consolidation in the Connector Industry

Bishop and Associates has just released an updated version of their research report analyzing the history of mergers and acquisitions in the connector, cable, and cable assembly market. This research report, which looks at acquisitions by year, by acquiring type (manufacturer, distributor, or private equity firm), and by manufacturer, examines how mergers and acquisitions have changed the landscape of the connector, cable and cable assembly industry.

Since their founding in 1985, Bishop & Associates has tracked acquisitions in the connector industry. These include acquisitions by manufacturers of connectors or cable and wire, manufacturers who produce cable assemblies or wire harnesses, distributors that focus on connectors as part of their product offering, and private equity companies. During this period, more than 850 acquisitions of these types have been recorded.

Since the beginning of the 21st century, many of these acquisitions, particularly those of traditional connector manufacturers, have ventured outside of the standard connector arena. Connector manufacturers over that time have acquired companies that focused on sensors, antennas, complex medical equipment, raw materials, software, and vehicle-to-vehicle and vehicle-to-infrastructure applications. Others have focused on specific product types, such as fiber optics or ruggedized connector and cable assemblies.

This report also looks at the history of individual acquirers. Of the more than 850 acquisitions recorded, over 600 or 77% were initiated by manufacturers. These acquisitions, which represent over 190 different manufacturers, include many companies who later become targets of acquisitions themselves. It also examines the individual acquisition history of these manufacturers, providing the total number of acquisitions during the period and how these totals compare with other manufacturers' acquisition habits.

History of M & A in the Connector Industry

Shrinking Footprints: Consolidation in the Connector Industry

Total Acquisitions by Year and Type

Year	Manufacturer	Distributor	Private Equity	Total Acquisitions
Prior to 2000	1XX	26	X	XX
2000	XX	2	X	XX
2001	X2	1	X	XX
2023	X	X	X	X
9 Mths 2024	X	X	X	X
Total	**6XX**	**XXX**	**XX.X%**	**8XX**
Percent of Total	**XX.X%**	**XX.X%**	**XX.X%**	**100.0%**

Amphenol Acquisitions by Year

Type	Company	Year	Acquisition Number
M	Amphenol acquires Carlisle Interconnect Technology	2024	XX
M	Amphenol acquired Lutze US	2024	XX
M	Amphenol acquired Times Fibers (from LPL)	1992	4
M	Amphenol acquired Socapex SA	1985	3
M	Amphenol acquired Advanced Circuit Technology	1998	2
M	Amphenol acquired AMP's Matrix Science line	1997	1

History of M & A in the Connector Industry

Shrinking Footprints: Consolidation in the Connector Industry

The following table of contents shows the detail provided in this new report.

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Chapter 6 – All Acquisitions by Year and Type

To Order the Updated Version of History of M & A in the Connector Industry - 2024

Shrinking Footprints: Consolidation in the Connector Industry

Research Report C-150-24, ***M&A in the Connector Industry - 2024*** is available for $5,285. If you would like additional information about this report, or would like to place an order, please complete the following information, and e-mail, or mail it to Bishop & Associates, Inc. To place your order on our website: **https://bishop-research.com/**.

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What's New ?

Bishop & Associates has recently completed several new research reports about the worldwide connector industry. A table of contents for each report can be found at **https://bishop-research.com**.

☐	**Report C-150-24**	**History of M&A in the Connector Industry 1950s-2024 (October 2024) NEW**
☐	**Report M-121-24**	**2024 Top 100 Connector Manufacturers (August 2024) NEW**
☐	**Report P-520-24**	**The Rectangular Input/Output Connector Market 2024 (July 2024) NEW**
☐	**Report F-2024-01**	**Connector Industry Forecast (June 2024) NEW**
☐	**Report C-122-24**	**Connector Industry Yearbook (June 2024) NEW**
☐	**Report M-700-24**	**World Connector Market Handbook (March 2024) NEW**
☐	**Report P-799-24**	**World Cable Assembly Market (February 2024) NEW**
☐	**Report P-606-23**	**Connector Types and Technologies Poised for Growth**
☐	**Report M-720-23**	**European Connector Market 2021, 2022, 2023F and 2028F**
☐	**Report P-430-23**	**World Circular Connector Market**
☐	**Report P-780-23**	**World RF Coax Connector Market**
☐	**Report M-1200-22**	**Military Ground Vehicle Market for Connectors**
☐	**Report P-675-22**	**Copper and Fiber Connectivity in the Data Center**
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☐	**Report P-420-22**	**IC Sockets – Systems & Connector Forecast 2020-2030**
☐	**Report M-310-21**	**Instrumentation Market for Connectors**
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THE BISHOP REPORT - CONNECTOR INDUSTRY YEARBOOK

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