

Manufacturing Market TM

INSIDER

inside the contract manufacturing industry

Vol. 29, No. 12

December 2019

Will 5G Change the Business of Manufacturing?

Most people who hear of 5G (and, increasingly, 6G) think of a wireless service for our handheld devices—of streaming video and downloading high-capacity files. When 4G arrived, the major use was obvious: content streaming. As consumers began to demand more bandwidth and better speeds to facilitate using online services such as YouTube, Netflix, and Spotify, telecom firms answered. In the next several years, the 5G network will introduce much new hardware, including upgraded mobile phones, modems, routers, and, most importantly, Internet of Things devices—but more on that later.

During 2019, China-based smart phone brands, including Huawei, Vivo, Xiaomi, Oppo, and ZTE, have released 5G smart phones, almost entirely in the domestic market. Because 5G smart phones are expected to be able to support heavy-workload applications such as streaming Ultra HD multimedia content, VR/AR, and cross-platform IoT connection, phone vendors are working to improve their devices' computing performance, reliability, power consumption, heat dissipation, screens, and camera functions.

Today, Ericsson, Huawei, Qualcomm, Samsung, Intel, and other vendors are already researching the set of new technologies required and some are offering 5G-related hardware solutions (not yet end to end), as well as working with telecom

firms in 5G deployment tests. The network itself will have to be very robust and high speed so as to accommodate things like motion control, connected vehicles, and high-throughput vision systems. Deployments across the 450 MHz–6 GHz and 4 GHz–52 GHz ranges are in play. We can expect incremental rollouts as telecom providers build, test, and release the architecture required to facilitate 5G, and reliance on existing 4G infrastructure is peeled away.

According to Gartner, the worldwide 5G market will be worth \$4.2 billion by the end of 2020, though details on this are only available to Gartner service subscribers. Many OEMs began deployment in 2019; sources report that 4 million Koreans had 5G phones by October, with 5 million expected by year end. China has deployed over 100,000 base stations. 150 million 5G mobile subscribers are expected by 2020 in China. Nine companies are shipping 5G phones in December 2019, including Huawei, which has signed over 60 contracts for 5G, driving handset prices as low as US\$470 in China. Indoor hubs,

sometimes called MiFi, are available from Verizon in the US, and Optus in Australia.

5G millimeter wave (mmWave) is the fastest, with actual speeds often of a gigabit or two. Verizon's 28-GHz network is the largest. Frequencies are above 24 GHz and soon will be up to 72 GHz. The reach is short, so more cells are required. mmWave 5G bands are 400 MHz, allowing much faster speeds than the lower bands of 20–100 MHz. mmWave has difficulty traversing many walls and windows, so indoor coverage is limited.

5G mid-band is the most widely deployed, in over 20 networks. Speeds in a 100-MHz band are usually 100–400 megabits. In the lab and occasionally in the field, speeds can go over a gigabit. Frequencies deployed are from 2.4 GHz to 4.2 GHz. Sprint and China Mobile are using the 2.5-GHz spectrum. Others are mostly between 3.3 and 4.2 GHz, where the reach is better. Many areas can be covered simply by upgrading existing towers, which lowers the cost.

Some articles in this issue

Cover Story	1
Will 5G Change the Business of Manufacturing?	
Nine-Month Sales Increase for Large CMs	3
Decent Results for North American Group	4
Modest Growth in Q3 for European Providers	7
Company News	8

5G low-band offers capacity similar to advanced 4G. T-Mobile and AT&T are launching this in the first week of December 2019. T-Mobile CTO Neville Ray warns that speeds on his 600-MHz 5G may be as low as 25 Mbit/s download. AT&T, using 850 MHz, will also deliver less than 100 Mbit/s in 2020. The performance will improve, but cannot be much higher than good 4G in the same spectrum.

Verizon, AT&T, and almost all 5G contenders in 2019 have latencies between 25 and 35 milliseconds. The “air latency” (between the phone and a tower) in 2019 equipment is 8–12 ms. The latency to the server, further back in the network, raises the average to ~30 ms, 25–40% lower than typical 4G deployed. Adding “edge servers” close to the towers can bring latency down to 10–20 ms. Lower latency, such as the often-touted 1 ms, is years away and does not include the time to the server.

But there is another dimension of 5G that will affect contract manufacturers more than the end products that are assembled, and this concerns the fourth Industrial Revolution, often referred to as “Industry 4.0,” that will usher in smart factories. In these futuristic factories, connected devices can sense their environments and interoperate with each other, making decentralized decisions. Many expect this transformation to rely on the underlying capabilities of next-generation 5G networks. These smart factories will revolutionize the manufacturing process even further as they unify the entire supply chain.

Industry 4.0 relies on connectivity. Without a stable, fast connection, industrial networks cannot capture or process data on the floor generated by IoT sensors, or at the edge, and this information cannot be used for equipment monitoring or maintenance. Operators are unable to see problems emerge in real time, and both SDN and automation-based

architecture may not function properly.

The first of these challenges involves gathering operational intelligence. As networks grow and become smarter, they will produce far more information than did their predecessors. Manufacturers that can capture and crunch this information could produce actionable intelligence that increases productivity. 5G’s low latency and high-bandwidth capabilities can support this increasing data flow. Aside from increasing throughput, analyzed data can also help reduce downtime. The 5G-connected sensors can channel real-time information about equipment performance, ranging from vibration to noise data. Combined with machine-learning algorithms, this data can help companies predict when expensive equipment is about to fail, reducing the likelihood of costly downtime.

Because this network technology’s reliability is purportedly so high and its latency so low, equipment will communicate wirelessly with back-end systems for time-critical operations in ways that have not been possible before 5G. For the first time, this will combine fast production-line operations with the power of networked intelligence. We can expect new capabilities such as advanced visual recognition using the power of deep learning neural networks in the cloud. This will allow robotic systems to visually inspect products for quality control purposes in real time, with a high degree of accuracy.

The smart factory defines the shift in industrial settings from legacy systems to connected technologies. This can include the use of Internet of Things (IoT) devices, sensors, edge computing, self-healing networks, and automation, and it is expected that the wireless technology will not only facilitate more IoT devices, but also improve data collection, latency, and the automation of information streams.

Thus, 5G is a key enabler for IoT, as it provides for the efficient capture, transmission, and rendering of visual, audio, and perception-based information—and this, in turn, can only be managed through high-speed mobile networks.

In regard to self-triggered order placement based on inventory level, 5G’s ability to connect 10–100 times more devices with better security protocols and 99.9 percent availability will make these transactions more reliable. 5G will also allow for virtual testing of parts and packing from suppliers, such as 3D X-ray imaging to create extremely accurate digital replicas of manufactured components to verify their specifications remotely.

The initial investment required to shift from wired connections and 3G/4G will make the switch difficult for EMS companies. Until 5G-enabled smart factories definitively provide an ROI, CM companies will likely bide their time before spending their funds on overhauling existing infrastructure.

It is unlikely for many years to come that the industrial sector will be able to achieve the full speeds and connectivity promised by 5G, as many firms will rely on legacy systems and older networks until upgrades become necessary. To a large extent, the challenges that manufacturers face relate to the efficacy of the business case. For example, if a factory is making the same automotive parts it has been manufacturing for the past 50 years, it might not choose to invest in putting sensors on its machinery. However, if the factory can build a business case that demonstrates how the ability to capture manufacturing data will improve quality, output, and productivity, then its executives will invest.

Nine-Month Sales Increase for Large CMs

Based on nine-month sales of 17 of the largest contract

manufacturers, the outsourced manufacturing space experienced low growth, depending on one's focus. Nine-month revenue for the 17 CMs totaled \$296.0 billion, up 2.2% year over year. Sales (in US dollars) were up at 11 companies, with 6 of them showing double-digit growth (Table 1, p. 4).

The 17 CMs consist of nine EMS providers, five ODMs, and three hybrid providers. *MMI* recently began using the hybrid category to identify companies that do substantial amounts of both ODM and EMS work and to separate them for the purposes of analysis from those whose sales put them in the traditional EMS or ODM classes. *MMI* believes that this three-way system, though far from perfect, will yield a clearer picture of EMS versus ODM performance while acknowledging the rise of the hybrid model.

Nine-month sales were up collectively for all three groups; however, combined sales for the EMS group were the highest, showing 3.3% growth, thanks to strong performances by **Plexus** (25.6%) and others with strong double-digit gains that included **Kimball Electronics** (13.8%), **Jabil** (13.7%), **Sanmina** (12.7%), and **Universal Scientific Industrial** (12.7%).

EMS providers generated the majority of the 17 CMs' sales for the period. Revenue in the EMS category amounted to \$175.3 billion, or 59.2% of overall sales. ODMs contributed \$67.0 billion, or 22.6% of sales, while the hybrid group accounted for \$53.7 billion, or nearly 18.1% of sales.

In a nine-month year-to-year comparison, ODMs increased their revenue by only 0.6% and the

three hybrid providers by 0.9% (Chart 1, below right). As demonstrated in the past, the EMS group is gaining share and posed a competitive threat to both the ODM and hybrid companies.

MMI has deleted three companies from its analysis. These include **Cal-Comp Electronics**, the holding company for Kinpo Electronics (counting it resulted in double counting). **Ability Enterprise** was dropped from coverage due to bad performance, and **Shenzhen Kaifa** was eliminated because it does not provide quarterly reports for analysis.

Of the 11 CMs that grew their nine-month revenue, two are hybrid providers, three are ODMs, and six are EMS providers (Table 1). The returns range from Kinpo Electronics' 30.7% year-to-year growth to that of **Benchmark Electronics**, which posted the largest decrease (-11.5%) in the group.

Hon Hai Precision Industry, the EMS giant, had a very minor impact on the combined nine-month sales of all 17 CMs, with growth of 2.5% year to year. Without Hon Hai, combined sales would have been up 2.1% from a year earlier, versus 2.2% including Hon Hai.

While nine-month sales were up overall for the 17 CMs, third-quarter results presented a brighter picture on a quarter-to-quarter basis. Totaling \$108 billion, Q3 sales for the entire group rose 11.5% sequentially. Sales increases as 12 CMs carried the day, and three of those gains were of the double-digit variety.

There was a wide range in Q3 sales results among the three CM groups. On a year-over-year basis, Q3 sales in the hybrid category increased 1.1%, compared with a 5.9% decrease for

ODMs and -0.7% growth for the EMS providers. When compared with the prior quarter, the EMS group led with a 14.7% gain; the hybrid group followed with a 12.4% increase; and the ODM providers had 2.9% growth (Table 2, p. 4).

When combined, Q3 income for the 17 CMs was approximately \$1.8 billion, up from about \$1.3 billion in the prior quarter and up from about \$1.7 billion a year earlier. (Net income was approximate because not all companies follow the same accounting rules.) At eight companies, Q3 net income increased versus a year ago, overtaking the losses experienced at 9 other CMs. Overall, profits were up from the previous year, increasing from \$1.3 billion in 3Q18 to \$1.8 billion in 3Q19. Conversely, sales declined on a quarter-to-quarter basis for **Compal**, **Flex**, **Sanmina**, **Benchmark**, and **Venture Corporation**.

For the first nine months, the 17 CMs together earned net income of approximately \$4.5 billion. Net income increased in contrast to sales: Net income was up year over year by 2.7%. Aggregate net margin for the EMS providers stood at about 1.7%, above the CM average, while the net margins for the ODM and hybrid groups were below average, at about 1.3% and 1.1%, respectively.

Chart 1: Nine-Month Growth Year on Year (%)

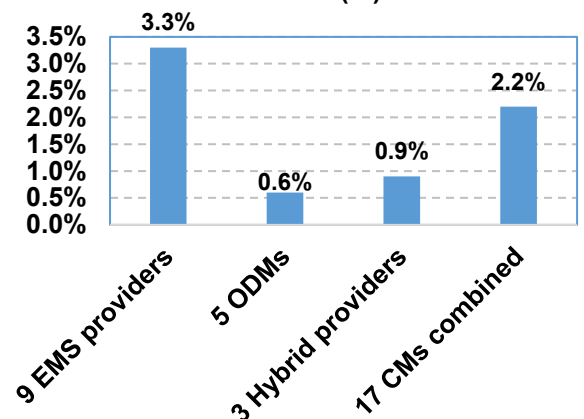


Table 1: Q3 and Nine-Month 2019 Results for 17 of the Largest Contract Manufacturers (US\$M or %)

Company	Primary Business	Head-quarters	Re-ports in US\$	3Q19 Sales	2Q19 Sales	Qtr.—Qtr. Chg.	3Q18 Sales	Yr.—Yr. Chg.	3Q19 Net Inc.	2Q19 Net Inc.	3Q18 Net Inc.	Q1–3 2019 Sales	Q1–3 2018 Sales	Yr.—Yr. Chg.	Q1–3 2019 Net Inc.	Q1–3 2018 Net Inc.
Hon Hai	EMS	Taiwan	No	45,501.4	38,026	19.7	46,502.3	-2.2	1,108.8	559.1	840.8	118,094.4	115,193.3	2.5	2,492.1	2,257.8
Pegatron	ODM/EMS	Taiwan	No	11,632.6	9,815.2	18.5	10,883.5	6.9	165.6	107.6	95.7	31,091.0	29,685.6	4.7	329.7	266.1
Quanta	ODM	Taiwan	No	8,693.2	8,057.1	7.9	9,536.5	-8.8	122.4	110.0	159.1	24,007.0	24,151.6	-0.6	332.8	372.4
Compal	ODM	Taiwan	No	8,194.2	8,275.2	-1.0	8,565.0	-4.3	59.0	68.3	126.2	23,374.4	23,331.4	0.2	162.0	244.7
Flex	EMS	Singapore	Yes	6,088.0	6,176.0	-1.4	6,710.6	-9.3	(116.9)	44.9	86.9	18,490.0	19,545.4	-5.4	(136.4)	183.3
Wistron	ODM/EMS	Taiwan	No	7,091.5	6,739.3	5.2	7,694.3	-7.8	85.3	85.6	42.0	20,591.6	21,538.4	-4.4	240.7	94.9
Jabil	EMS	Florida	Yes	6,574.0	6,136.0	7.1	5,771.8	13.9	52.7	43.5	54.1	18,777.0	16,509.9	13.7	163.6	164.8
Inventec	ODM	Taiwan	No	4,219.9	4,190.2	0.7	4,768.1	-11.5	23.1	31.9	53.1	12,176.2	12,651.9	-3.8	127.7	172.3
Sanmina	EMS	California	Yes	1,892.0	2,027.0	-6.7	1,876.3	0.8	19.8	42.9	(0.2)	6,046.0	5,365.3	12.7	103.6	58.4
Celestica	EMS	Canada	Yes	1,711.3	1,695.2	0.9	1,711.3	0.0	36.0	40.2	8.6	4,839.5	4,906.2	-1.4	110.1	38.8
Kinpo Electronics	ODM	Taiwan	No	1,157.8	1,118.6	3.5	944.0	22.6	(18.2)	10.7	6.5	3,367.8	2,576.8	30.7	14.0	4.0
Qisda	ODM	Taiwan	No	1,403.4	1,351.9	3.8	1,340.9	4.7	27.1	42.2	40.4	4,062.0	3,850.4	5.5	123.7	101.7
Universal Scientific Industrial	EMS	China	No	1,722.9	1,054.5	63.4	1,470.9	17.1	71.5	25.2	60.7	3,939.5	3,494.6	12.7	130.5	122.7
Plexus	EMS	Wisconsin	Yes	810.0	800.0	1.3	640.7	26.4	36.8	24.8	31.6	2,399.0	1,909.4	25.6	86.4	35.2
Benchmark Electronics	EMS	Texas	Yes	555.0	601.6	-7.7	683.8	-18.8	13.7	9.4	7.8	1,759.4	1,987.1	-11.5	36.9	69.6
Venture Corp.	ODM/EMS	Singapore	No	643.8	669.3	-3.8	581.8	10.6	63.3	67.3	61.0	1,999.7	1,953.8	2.3	197.9	198.8
Kimball Electronics	EMS	Indiana	Yes	313.4	312.0	0.4	265.6	18.0	6.6	6.2	17.5	940.4	826.3	13.8	24.6	35.3
Total/Avg.				108,204	97,045	11.5	109,948	-1.6	1,757	1,320	1,692	295,955	289,477	2.2	4,540	4,421
Total/Avg. without Hon Hai				62,703	59,019	6.2	63,445	(1.6)	648	761	851	177,861	174,284	2.1	2,048	2,163

Results in non-US currencies were converted to US dollars by applying a three-month average exchange rate for the corresponding quarter. Average exchange rates were based on monthly 2018 and 2017 data from the US Federal Reserve. Company net profits shown here are attributable to shareholders. Net profit totals are approximate because not all companies follow the same accounting standard.

Table 2: Comparing Results Where Companies Are Grouped by Primary Business (US\$M or %)

Company (in order of 9-mo. sales)	Primary Business	3Q19 Sales	2Q19 Sales	Qtr.—Qtr. Chg.	3Q18 Sales	Yr.—Yr. Chg.	3Q19 Net Inc.	2Q19 Net Inc.	3Q18 Net Inc.	Q1–3 '19 Sales	Q1–3Q '18 Sales	Yr.—Yr. Chg.	Q1–3 '19 Net Inc.	Q1–3 '18 Net Inc.
9	EMS	65,168.0	56,828.1	14.7	65,633.4	-0.7	1,229.0	796.2	1,107.8	175,285.2	169,737.5	3.3	3,011.4	2,965.9
5	ODM	23,668.6	22,993.1	2.9	25,154.6	-5.9	213.5	263.1	385.3	66,987.4	66,562.1	0.6	760.2	895.1
3	EMS/ODM	19,367.9	17,223.8	12.4	19,159.6	1.1	314.2	260.6	198.7	53,682.3	53,177.8	0.9	768.4	559.8
17		108,204	97,045	11.5	109,948	-1.6	1,757	1,320	1,692	295,955	289,477	2.2	4,540	4,421

Net profit totals are approximate because not all companies follow the same accounting standard.

Decent Results for North American Group

For a group of seven mid-tier and smaller EMS providers based in North America, combined Q3 sales were much better than those of top-tier CM companies when compared on a year-over-year as well as a quarterly basis.

On a year-over-year basis, the group's revenue was up 15.0%, versus the prior quarter, when revenue was up 1.5%.

Q3 sales for the group of seven North America-based providers totaled \$746 million, representing good growth from the group's year-earlier revenue of \$648.6 million. Among the group, year-over-year sales performance

varied greatly, ranging from 65.2% for SMTC to -2.9% for KeyTronic. There were annual sales increases among six of the seven providers (Table 3, p. 5), which illustrates the positive health of the North American EMS market. Similarly strong indications are evident from third- and fourth-tier suppliers that are being sustained by a robust North American economy.

In the sequential comparison, Q3 sales increases at three out of seven providers were offset by decreases at the other four providers. As a result, the group's quarterly revenue growth was a mere 1.5%, as stated. Only **Nortech Systems** raised its revenue from the previous quarter by a double-digit percentage.

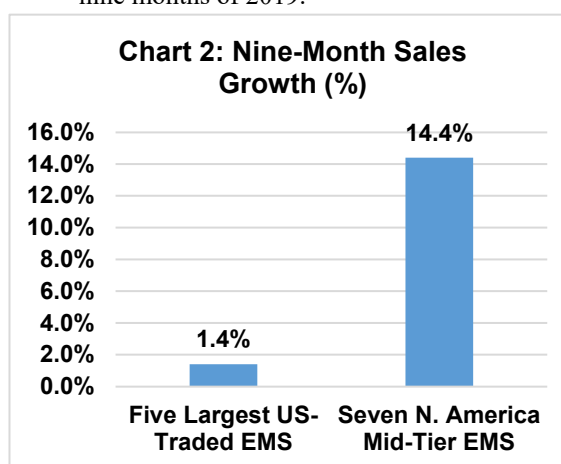
For the first nine months of 2019, sales for the seven mid-tier EMS providers increased compared with those of their larger counterparts. Nine-month sales for the seven mid-tier and smaller providers increased by 14.4% year over year, compared with much lower growth for their larger, Tier 1 competitors (1.4%). Collectively, the seven mid-tier providers generated sales of over \$2.2 billion for the first nine months, good growth from \$1.95 billion in the year-ago period. Sales increases at all but one (KeyTronic) of the seven providers were enough to boost combined sales. SMTC, IEC Electronics, and Kimball Electronics turned in double-digit gains, with 108.6%, 21.6%, and 14.4% increases, respectively.

The group of seven mid-tier and smaller providers consists of six companies in the EMS space, all publicly traded, and one EMS unit within a larger publicly held corporation.

The six stand-alone providers increased their gross margins sequentially and five raised their margins year over year (Table 3). Not all of the companies profiled report statistics that are comparable, and many are missing.

The six stand-alone mid-tier providers combined for a 3Q19 net income of \$5.1 million, compared with net income of \$8.2 million in 2Q19. Kimball Electronics achieved the highest net income in the group of \$6.6 million in 3Q19.

For the first nine months, net income for the stand-alone providers averaged out to \$25.1 million, a steep decline from the previous year, when they achieved a net income of \$45.1 million. Kimball Electronics posted the highest net income of \$25.9 million for the first nine months of 2019.



A Brief Look at Some Providers

Ducommun, Incorporated (NYSE: DCO). Ducommun's Electronic Systems segment net revenue for the current-year third quarter was \$90.6 million, compared to \$89.3 million for the third quarter of 2019. The year-over-year increase was due to the following: \$5.0 million higher revenue within the company's military and space end-use markets due to higher build rates on other military and space platforms and various missile platforms, partially offset by lower military rotary-wing aircraft due to timing of orders; and \$0.2 million higher revenue within the company's commercial aerospace end-use markets.

The Electronic Systems segment operating income was \$9.7 million, or 10.7% of revenue, for the third quarter of 2019 compared to \$9.1 million, or 10.6% of revenue, for the comparable quarter in 2018. The year-over-year increase of \$0.6 million was due to lower restructuring charges.

IEC Electronics Corp. (NYSE: IEC). IEC reported revenues of \$43.9 million for its fourth quarter of fiscal 2019, an increase of 28.3% as compared to revenues of \$34.2 million for its fourth quarter of the year ended September 30, 2018, and a 9% increase sequentially compared to revenue in the third quarter of fiscal 2019. Gross margin for the fourth quarter of fiscal 2019 was 14.6%, an increase of 150 basis points compared to the same quarter last year.

Table 3: Q3 and Nine-Month 2019 GAAP Results for Seven Mid-Tier and Smaller EMS Providers

Based in North America (M\$ or %)

Company	3Q19 Sales	2Q19 Sales	Qtr.-Qtr. Chg.	3Q18 Sales	Yr.-Yr. Chg.	3Q19 Gross Marg.	2Q19 Gross Marg.	3Q18 Gross Marg.	3Q19 Net Inc.	2Q19 Net Inc.	3Q18 Net Inc.	Q1-3 2019 Sales	Q1-3 2018 Sales	Yr.-Yr. Chg.	Q1-3 19 Net Inc.	Q1-3 18 Net Inc.
KeyTronic	105.3	105.5	-0.2	108.4	-2.9	8.8%	7.9%	7.5%	1.6	0.8	1.6	318.8	352.9	(9.7)	2.4	2.2
SMTC	88.7	90.9	-2.4	53.7	65.2	10.0%	9.9%	9.8%	-5.7	-2.5	0.9	282.2	135.3	108.6	(7.0)	0.8
SigmaTron	74.0	74.8	-1.1	71.4	3.6	9.4%	9.3%	8.1%	0.4	0.3	(0.5)	222.1	205.4	8.1	1.6	-4.3
IEC Electronics	43.9	40.3	8.9	34.2	28.3	14.6%	13.9%	13.1%	1.8	1.2	9.1	116.5	95.8	21.6	3.7	10.7
Nortech Systems	30.1	27.3	10.3	29.6	1.8	12.1%	8.5%	11.5%	0.4	(1.6)	0.4	85.6	84.5	1.3	(1.6)	0.4
Kimball Electronics	313.4	318.6	-1.6	265.6	18.0	4.6%	3.2%	6.8%	6.6	7.5	5.1	945.5	826.3	14.4	25.9	35.3
Subtotal/Avg.	655.4	657.4	-0.3	562.9	16.4				5.1	8.2	16.5	1,970.7	1,700.2	16.6	25.1	45.1
EMS Unit of Larger Public Companies																
Ducommun*	90.6	89.3	1.5	85.7	5.7						9.1	264.1	252.5			23.5
Total/Avg.	746.0	746.7	1.5	648.6	15.0							2,234.8	1,952.7	14.4		

Operating and net income are not necessarily equivalent to GAAP results on a stand-alone basis. Segment operating income did not include corporate general and administrative expenses. (*) For Ducommun, we have considered its Electronic Systems segment numbers.

Selling and administrative expenses were \$3.7 million in the fourth quarter of fiscal 2019, or 8.4% of sales, as compared to \$2.9 million, or 8.5% percent of sales, in the fourth quarter of fiscal 2018. Operating profit was \$2.7 million for the quarter, an increase of 70% when compared to the same quarter in the prior fiscal year. The company reported net income of \$1.8 million, or \$0.17 per basic and diluted share, for the fourth quarter of fiscal 2019, compared to net income of \$9.1 million, or \$0.89 per basic share and \$0.87 per diluted share, in the fourth quarter of fiscal 2018. Net income for the fiscal 2018 fourth quarter included a one-time tax benefit of \$7.8 million or \$0.76 per share. On a non-GAAP basis, excluding the one-time tax benefit, fourth-quarter 2018 net income was \$1.3 million or \$0.13 per basic and \$0.12 per diluted share.

Revenues for fiscal 2019 increased 34.3% to \$157.0 million as compared to \$116.9 million for fiscal 2018. Gross margin for fiscal 2019 improved to 13.8%, up 170 basis points from fiscal 2018 performance. Selling and administrative expenses were \$14.1 million in fiscal 2019 but decreased as a percentage of sales to 9.0%, as compared to \$11.4 million or 9.8% of sales for fiscal 2018. Operating profit was \$7.6 million for fiscal 2019, which represents a 178% increase over the prior fiscal year. Net income for fiscal 2019 was \$4.7 million, or \$0.46 per basic share and \$0.45 per diluted share. Net income for fiscal 2018 was \$10.4 million, or \$1.01 per basic and diluted share. Fiscal 2018 net income included one-time tax benefits of \$8.8 million or \$0.86 per basic and diluted share. On a non-GAAP basis, excluding the one-time tax benefit, fiscal 2018 net income was \$1.6 million or \$0.15 per basic and diluted share.

KeyTronic Corporation (NASDAQ: KTCC). For the fourth quarter of fiscal year 2019, KeyTronic reported total revenue of \$105.3 million, compared to \$117.0 million in the same period of fiscal year 2018. For fiscal year 2019, total revenue was \$464.0 million, up 4% from \$446.3 million in fiscal year 2018.

For the fourth quarter of fiscal year 2019, the company had net income of

\$0.8 million or \$0.08 per share, compared to a net loss of \$(2.2) million or \$(0.20) per share for the same period of fiscal year 2018. For fiscal year 2019, net loss was \$(8.0) million or \$(0.74) per share, which includes an impairment of goodwill and intangibles of \$12.5 million reported during the third quarter of fiscal 2019. This is compared to a net loss of \$1.3 million or \$(0.12) per share for fiscal year 2018.

In the fourth quarter of fiscal year 2019, KeyTronic saw a disruption in deliveries of a critical component from a supplier in China; delays in the ramp of a new program due to customer-driven design changes; and temporary reductions in customer demand due to concerns over tariffs and trade tension between the US and Mexico. Moving into the first quarter of fiscal 2020, the disruption and delays experienced in the fourth quarter have been largely resolved and the company expects revenue to increase.

During the fourth quarter, KeyTronic continued to win significant new business from EMS competitors and from existing customers, including new programs involving smart security, architectural LED lighting, power meters and smart grid, and wireless power solutions. The company also continues to invest in new equipment and processes to be more productive in its Mexico and Vietnam facilities, as well as expanding and enhancing its profitable US facilities.

Kimball Electronics, Inc. (NASDAQ: KE). Kimball reported first-quarter 2020 net sales of \$313.4 million, up 18% from the prior-year first quarter. Net income was \$6.6 million and diluted earnings per share were \$0.26. A \$3.5 million amount was returned to share owners during the quarter in the form of common stock repurchases.

The **GES** acquisition added 2% to net sales for the quarter, but unfavorable foreign currency movements adversely impacted consolidated net sales by approximately 2% compared to the same quarter a year ago.

Operating activities provided cash of \$39.6 million during the quarter, which compares to cash used by operating activities of \$10.0 million in the first quarter of fiscal year 2019.

Cash conversion days (CCD) for the quarter ended September 30, 2019 were 73 days, which declined sequentially from 77 days in the fourth quarter of fiscal year 2019 from improvement in days sales outstanding as a result of increased utilization of accounts receivable factoring arrangements. CCD is calculated as the sum of days sales outstanding plus contract asset days plus production days supply on hand less accounts payable days. Cash and cash equivalents were \$55.4 million and borrowings outstanding on credit facilities were \$109.6 million as of September 30, 2019, including \$91.5 million classified as long-term debt.

Investments in capital expenditures were \$11.7 million during the quarter.

SMT Corporation (NASDAQ: SMTX). SMTC reported a 65.2% year-over-year increase in revenue, compared to the third quarter of 2018. On a pro forma basis, revenue declined 5.4% compared to the third quarter of 2018. Factors contributing to the year-over-year revenue decline on a pro forma basis included customer inventory rebalancing as lead times in the supply chain shortened, and customer concerns about uncertainties relating to the prolonged impact of tariffs and macroeconomic conditions in certain end markets, including the semiconductor sector, which was supply constrained in 2018.

Adjusted EBITDA increased from \$2.4 million to \$6.3 million, or by 161.1%, and from \$5.5 million to \$6.3 million on a pro forma basis, or 13.6%, compared to the third quarter of 2018. The improvement in adjusted EBITDA was due to gains from operational efficiencies and synergies achieved and increased scale from the completed integration of **MC Assembly** following the November 2018 acquisition of that company.

During the first nine months of 2019, SMTC achieved an increase in its revenues to \$282.2 million, or 14.5% on a pro forma basis, and achieved an even steeper improvement to its adjusted EBITDA, which grew 54% to \$17.8 million on a pro forma basis.

The expansion of its customer base was led by important customer wins in the aerospace and defense, industrial, power and clean technology, and test and measurement markets over the same period a year ago.

As indicated in its September 19, 2019 press release, the current geopolitical environment caused a number of SMTC's customers to re-source their manufacturing away from vendors operating in China, and as a result, the company has seen a decline in demand for products built at its China site. SMTC has been working with its customers to transfer production out of its Dongguan, China manufacturing operations, and is currently winding down the facility, with completion expected by the end of this year. Revenue attributable to the Dongguan manufacturing operations accounted for 5.3% of its revenue in the first three quarters of 2019, according to Ed Smith, SMTC president and CEO.

SMTC recorded \$5.5 million of charges in the third quarter related to the closure of its China manufacturing operations that includes \$3.5 million of non-cash accelerated asset write-downs and \$2.0 million of cash-based expenses and employee-related costs.

SigmaTron International (NASDAQ: SGMA). In September 2019, SigmaTron reported revenues and earnings for the fiscal quarter ended July 31, 2019. Revenues increased to \$74.0 million in the first quarter of fiscal 2020 from \$71.4 million for the same quarter in the prior year. Net income increased to \$361,025 for the quarter ended July 31, 2019, compared to a net loss of \$526,607 for the same period in the prior year. Basic and diluted earnings per share for the quarter ended July 31, 2019 were each \$0.09, compared to basic and diluted loss per share of \$0.12 each for the same quarter ended July 31, 2018.

SigmaTron reports that projections for current customer sales remain positive, which it believes will result in continued growth. Additionally, the company is launching products with new customers during its second quarter, which should provide significant growth for calendar 2020.

Modest Growth in Q3 for European Providers

Third-quarter sales for a group of five European EMS providers experienced good growth compared with the year-earlier period. Revenue for the five providers totaled €910 million, versus €853 million in the year-ago quarter. Growth in Q3 year-to-year sales was 6.6%.

Revenue increases were reported in four out of five providers, with **Kitron**'s growth rate of 31% the highest (Table 4). **Scanfil** and **Connect Group** were two other EMS providers to achieve double-digit growth, with Q3 increases of 16.0% and 11.1% year over year, respectively. **Neways**' net turnover increased by 7.1% to €264.5 million, largely driven by a stronger contribution from the semiconductor and automotive sectors and to a lesser extent from the industrial sector. Medical and defense remained stable. Order intake was 6.8% higher than in the first half of 2018, largely due to new e-mobility orders. The order book stood at €342.6 million at the end of June 2019, compared with €300.8 million at the end of June 2018. Gross margin rose by 5.2% to €101.6 million, largely as a result of higher activity levels. EBITDA rose to €15.6 million (including an IFRS 16 impact of €2.6 million), compared with €15.1 million in the first half of 2018. Net income declined by 25.0% to €5.1 million.

LACROIX Group reported revenue growth of +7.3% in the fourth quarter. The annual revenue of the Group shows 2.8% growth to €481.7M. This includes very dynamic sales in infrastructure management equipment (organic growth of 17.5% in the Smart Environment segment and 6.4% in the Smart City segment), driven by the integration of SAE IT systems in the field of Smart Grids (€11.9M contribution over the year).

Smartnodes, the start-up acquired during the summer, contributed only marginally to the revenue of the period. In the future, this will strengthen the momentum of the Group's revenue growth in sales of

smart equipment.

There were sustained sales of electronic equipment for third parties, a segment that enjoys multiskill, multisector positioning. Aside from the impact of the temporary production stoppage at LACROIX's Tunisian plant (–€6.2M over the year), the activity would post almost stable sales (–1.7%), with a positive Q4.

Scanfil Group reported turnover in the third quarter of €152 million, showing an increase of €21 million, 16% from the previous year. More than half of the growth was organic, and the rest from the acquisition of HASECElektronik GmbH in June. The turnover growth was particularly strong in the industrial and medical technology segments. The quarter was operationally strong: Operating profit increased 38% year on year to €12.1 million, 7.9% from the turnover. Strong profitability was driven by its factories' overall good performance and high utilization rate, as well as by favorable product mixes. Net cash flow from operations for the quarter was €7.3 million. At the end of the period, Scanfil's equity ratio was 43.3%, and gearing was 40.5%. Scanfil's financial position is currently stable.

Kitron's revenue for the third quarter was NOK738 million (NOK563 million), an increase of 31 percent compared to last year. Organic growth, excluding the acquisition of the EMS division of API Technologies Corp., was 21 percent. All market sectors grew. In absolute numbers, third-quarter revenue growth compared to the same quarter last year was particularly strong in the Defense/Aerospace and Offshore/Marine sectors.

Table 4: 3Q19 Results for Five European EMS Providers (M€ or Krone)

Company (in order of 3Q19 sales)	Reports Head- in € quarters	3Q19 Sales	3Q18 Sales	Yr.–Yr. Chg.	
Neways*	Netherlands	Yes	265	248	7.1%
Scanfil	Finland	Yes	152	131	16.0%
LACROIX Electronics	France	Yes	318	330	–3.6%
Kitron	Norway	No	91	69	31.0%
Connect Group*	Belgium	Yes	84	76	11.1%
Total			910	853	6.6%

* Reporting 1H19 and 1H18 sales. Results in non-euro currencies were converted to euros by applying a three-month average exchange rate for the corresponding quarter. Average exchange rates were obtained from OANDA. Connect Group was excluded from our analysis, as its latest quarterly results were unavailable.

Company News

CapitalWorks Acquires Libra Industries

Cleveland, Ohio private equity firm **CapitalWorks** has announced the acquisition of **Mentor** manufacturer **Libra Industries, Inc.** The company provides engineered printed circuit board assemblies, electromechanical assemblies, and electronic control solutions. Its clients are in a broad range of industries, including industrial automation, medical, military and aerospace, instrumentation, and LED lighting, making it a complementary addition to fellow contract manufacturer **GEMCITY Engineering and Manufacturing of** Dayton, Ohio, which CapitalWorks acquired in 2017. The Howell family has run the Libra business since its inception in 1980. It has 127 employees. Terms of the deal, completed in partnership with CEO Rod Howell, his family, and the Libra leadership team, were not disclosed. In other acquisition news, **BB Electronics A/S**, one of Scandinavia's leading service companies in the field of electronics production, has acquired Czech company **Wendell Electronics**, with 130 employees and revenues in 2018 of €12.5 million. Also, **PRIMEPULSE SE** has acquired **ETL Elektrotechnik Lauter GmbH**, a company that manufactures electronic components. The company strengthens the EMS business activities of PRIMEPULSE Group, which already consists of the **Katek Group** and **Steca Elektronik**, of Memmingen.

Intel Completes Sale of Smartphone Modem Business to Apple

Intel Corporation has completed the sale of the majority of its smartphone modem business to **Apple**. This transaction, valued at US\$1 billion, was originally announced in July 2019. The sale will enable Intel to focus on developing technology for 5G networks while retaining the option to develop modems for non-smartphone applications, such as PCs, IoT devices, and autonomous vehicles.

MacDermid Alpha Electronics Solutions Announces Acquisition of Kester

MacDermid Alpha Electronics Solutions, a leader in the production of innovative materials used in semiconductor, circuitry, and electronics assembly, announced that it has acquired **Kester** from **Illinois Tool Works, Inc.** Kester is a global supplier of assembly materials used in electronics assembly and semiconductor applications. The business has manufacturing facilities in the US and Germany and its products serve customers globally across a diverse set of end markets, including consumer electronics, telecommunications, medical, automotive, and military and aerospace.

Wistron Medical Deepening Deployment in Smart Healthcare Sector

Taiwan-based **Wistron Medical Technology** is deepening its deployment in four domains, seeking to leverage its parent firm's ICT prowess to informatize, digitalize, and "smart"-ize medical solutions, according to company CEO Donald Huang, concurrently chief technology officer at Wistron. Huang said Wistron Medical now focuses its efforts on *in vitro* diagnostics, medical imaging, robotic assistive devices, and smart hospital architecture incorporating AI and big data applications.

Publisher: Randall Sherman

Editor: Anna Reynolds

Senior Research Analyst: Vivek Sharma

Board of Advisors: Michael Thompson, CEO, I. Technical Services; Andy Leung, CEO, VTech Holdings, Ltd.

Manufacturing Market Insider is a monthly newsletter published by New Venture Research Corp., 337 Clay St., Suite 101, Nevada City, CA 95959. Phone (530) 265-2004, Fax (530) 265-1998. Copyright 2019 by NVR™. ISSN 1072-8651

The information and analysis presented here are based on sources believed to be reliable, but content accuracy is not guaranteed. The publisher shall not be held liable for any business decisions influenced by this publication.

E-mail: rsherman@mfgmkt.com

Website: www.newventureresearch.com

Subscription Form

I want an electronic subscription to **MMI**. Email me 12 monthly issues (PDF files) for the annual cost of US\$615.

I want a print subscription to **MMI**. Send me 12 printed issues for the annual cost of US\$715.

Payment is enclosed to New Venture Research Corp.

Mail or fax to: NVR Corp., 337 Clay St., Nevada City, CA 95959. Phone (530) 265-2004, Fax (530) 265-1998.

Please bill me. Charge my credit card (see below).

Name _____ Title _____

Company _____ Phone _____

Street Address _____ Fax _____

City/State/ZIP _____ Email _____

MasterCard _____ Visa _____ AMEX _____ Number _____ Expires _____