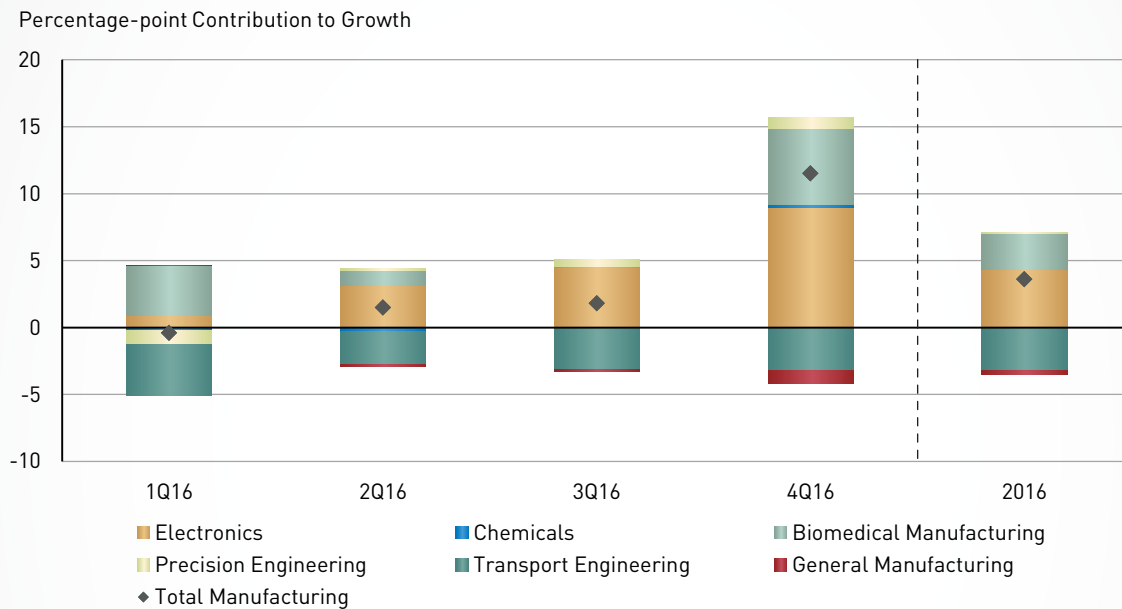


Drivers of Growth in the Manufacturing Sector

The manufacturing sector rebounded in 2016

The manufacturing sector grew by 3.6 per cent in 2016, a reversal from the 5.1 per cent decline in 2015. The recovery of the sector was underpinned by growth in the electronics, biomedical manufacturing (BMS) and precision engineering clusters (Exhibit 1). Specifically, these three clusters contributed 4.4 percentage-points (pp), 2.6pp and 0.1pp to overall manufacturing growth in 2016 respectively. On the other hand, the transport engineering (-3.1pp), general manufacturing (-0.3pp) and chemicals (-0.1pp) clusters contributed negatively to the sector's growth.

Exhibit 1: Overall manufacturing growth in 2016 was driven by the electronics, BMS and precision engineering clusters

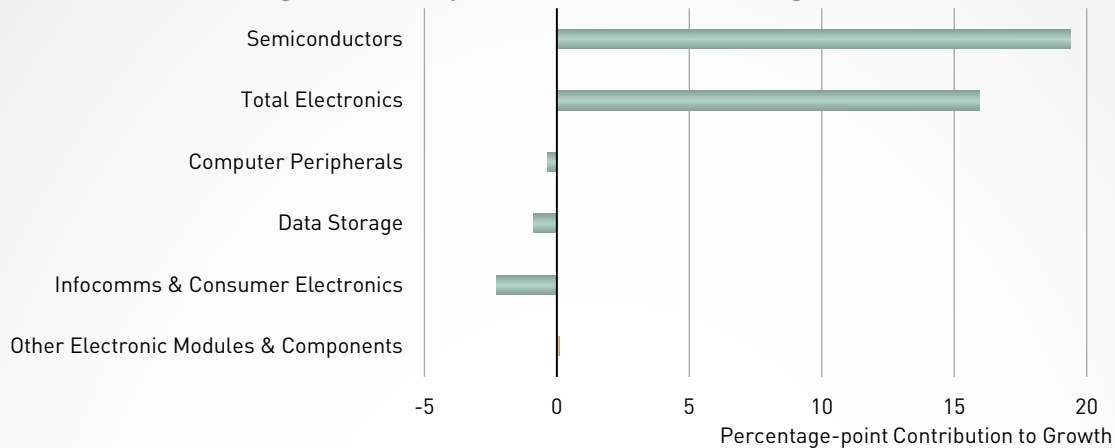


Source: Economic Development Board

The strong expansion in electronics production in 2016 was driven mainly by a recovery in global semiconductor demand

The electronics cluster expanded by 16 per cent in 2016, reversing the 6.8 per cent contraction in 2015. This strong outturn was driven by robust growth in the semiconductors segment (31 per cent). Indeed, the semiconductors segment contributed 19pp to the overall growth of the cluster, even as most of the other segments within the cluster weighed on growth (Exhibit 2).

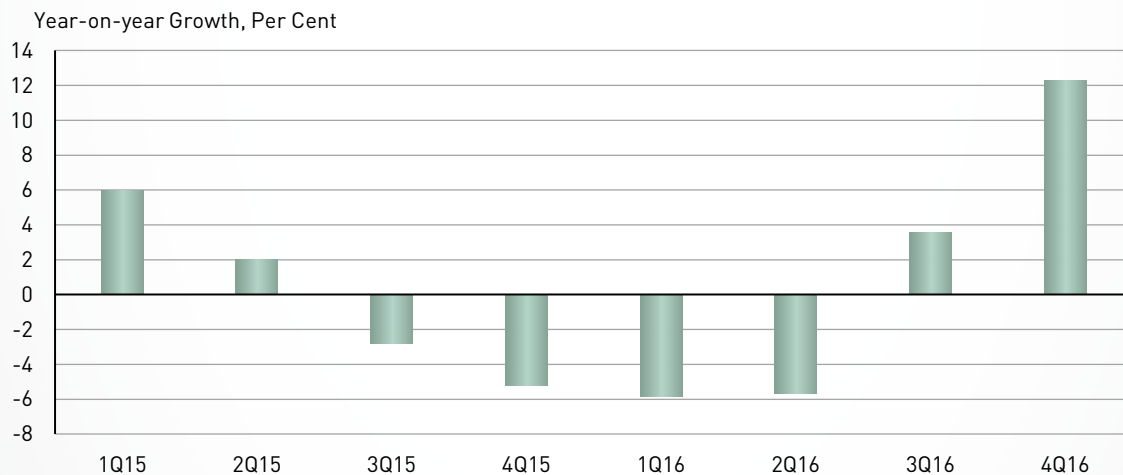
Exhibit 2: Semiconductors segment was the key driver of the electronics cluster's growth in 2016



Source: Economic Development Board

The strong performance of the semiconductors segment came on the back of a recovery in global semiconductor demand, especially in the later part of 2016.¹ According to the World Semiconductor Trade Statistics (WSTS), global semiconductor sales surged by around 12 per cent in 4Q16, a significant step-up from the 3.6 per cent increase in 3Q16, and surpassing many analysts' expectations (Exhibit 3).² For the whole of 2016, global semiconductor sales rose by 1.1 per cent, reversing the 0.2 per cent decline recorded in 2015. The recovery in global semiconductor sales was underpinned by healthy demand in major end markets such as the smartphone, automotive and solid state drive markets.³ Closer to home, the success of Chinese smartphone manufacturers in China has benefitted semiconductor firms (including fabless firms) in Singapore that supply to these smartphone producers.

Exhibit 3: Global semiconductor sales rebounded in the second half of 2016



Source: World Semiconductor Trade Statistics

¹ A firm-specific factor also led to higher output in the semiconductor segment since the start of 2016. Such firm-specific factors may arise from a company's decisions to adjust its operations in response to changes in their operating environment.

² In November 2016, the World Semiconductor Trade Statistics (WSTS) estimated that global semiconductor sales for the whole of 2016 would be flat, at around -0.1 per cent. In February 2017, WSTS announced that global semiconductor sales grew by 1.1 per cent in 2016, underscoring the strength of the recovery in 4Q16.

³ The healthy demand for semiconductors was in part driven by the higher level of semiconductor content in electronic devices, such as increased memory capacity in smartphones.

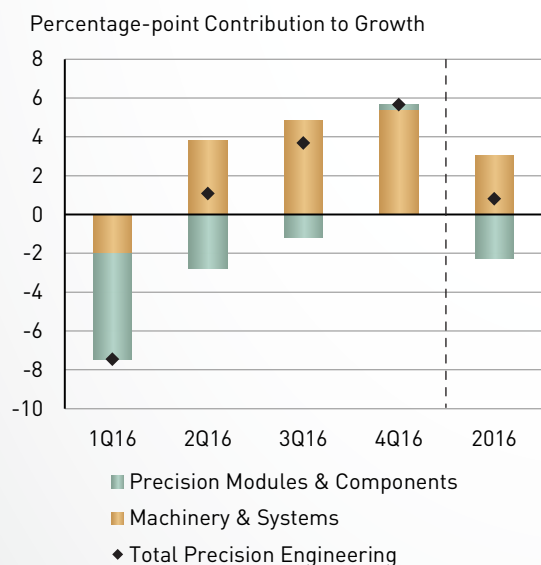
The strength of the semiconductors segment helped to offset the weakness stemming from the other segments of the electronics cluster, such as the computer peripherals, data storage and infocomms & consumer electronics segments. These segments were weighed down by sluggish demand in markets such as that for PCs and servers.

The BMS and precision engineering clusters were bolstered by healthy external demand for pharmaceuticals and semiconductor manufacturing equipment respectively

The BMS cluster grew by 14 per cent in 2016, a turnaround from the 2.6 per cent contraction in 2015. Growth was supported by output expansions in both the pharmaceuticals (14 per cent) and medical technology (13 per cent) segments. The former was boosted by the increase in production of existing and newly-introduced active pharmaceuticals ingredients, as well as biological products. The latter, on the other hand, continued to benefit from robust export demand for medical devices (e.g., analytical instruments for life science research), and new product launches.

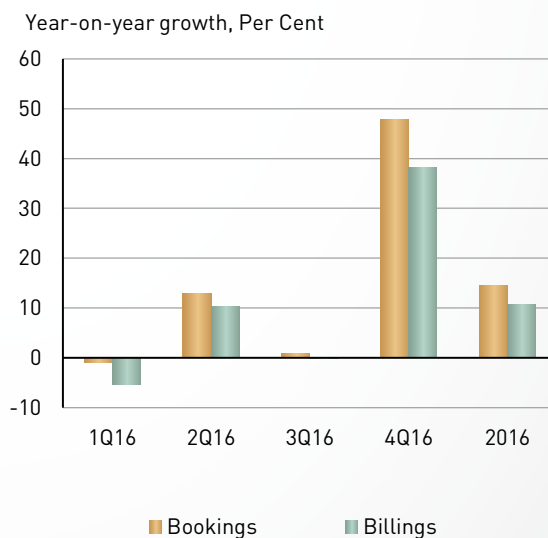
As for the precision engineering cluster, output expanded by 0.8 per cent in 2016, a reversal from the 3.9 per cent contraction in 2015. The cluster was mainly supported by the machinery & systems segment (Exhibit 4), which expanded by 5.1 per cent as a result of strong global demand for semiconductor manufacturing equipment. According to the Semiconductor Equipment and Materials International (SEMI), the bookings and billings of North America-based semiconductor equipment manufacturers – indicators commonly used to track global demand for such equipment – rose robustly by 14 per cent and 11 per cent respectively in 2016 (Exhibit 5). The recovery in global demand for semiconductor manufacturing equipment can be attributed to a few factors. First, there has been a ramp-up in wafer fab capacity investments by Chinese semiconductor manufacturers, supported in turn by the Chinese government’s efforts to improve China’s self-sufficiency in the production of semiconductors. Second, leading global semiconductor manufacturers have stepped up their investments in leading edge wafer manufacturing process technologies in order to maintain their technological lead. Third, an undersupply of capacity in the global flash memory market has spurred semiconductor capital investments.

Exhibit 4: Precision engineering cluster’s growth in 2016 was supported by the machinery & systems segment



Source: Economic Development Board

Exhibit 5: Bookings and billings of North America-based semiconductor equipment manufacturers rose in 2016



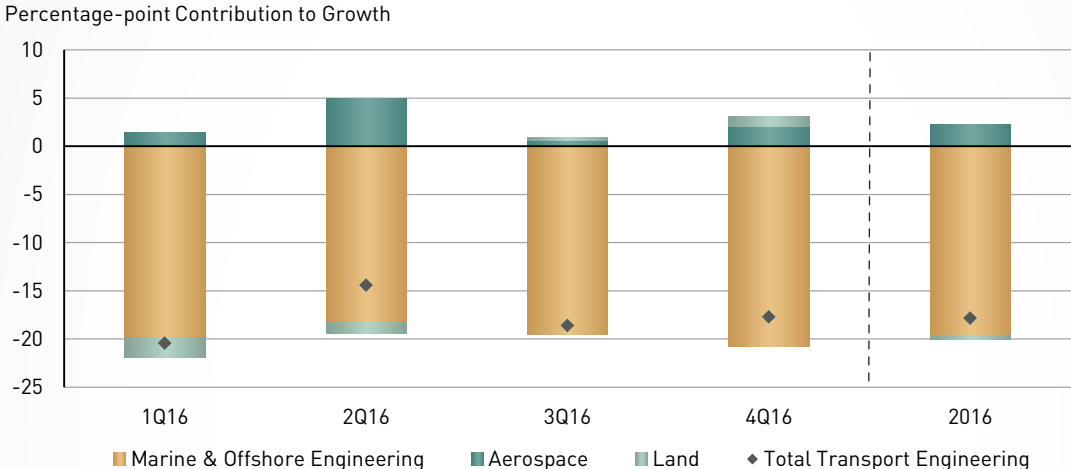
Source: Semiconductor Equipment and Materials International

In contrast to the machinery & systems segment, the precision modules & components segment of the precision engineering cluster contracted by 5.7 per cent in 2016. The segment's weak performance could be partly attributed to firms supporting the global oil and gas industry, which has been adversely affected by sustained low oil prices.⁴

On the other hand, the transport engineering cluster continued to pose a significant drag on overall manufacturing growth

The transport engineering cluster shrank by 18 per cent in 2016, extending the 13 per cent contraction in 2015. The performance of the cluster was adversely affected by the marine & offshore engineering (M&OE) segment, while the aerospace segment provided some support to the cluster (Exhibit 6).

Exhibit 6: The M&OE segment weighed heavily on the transport engineering cluster in 2016



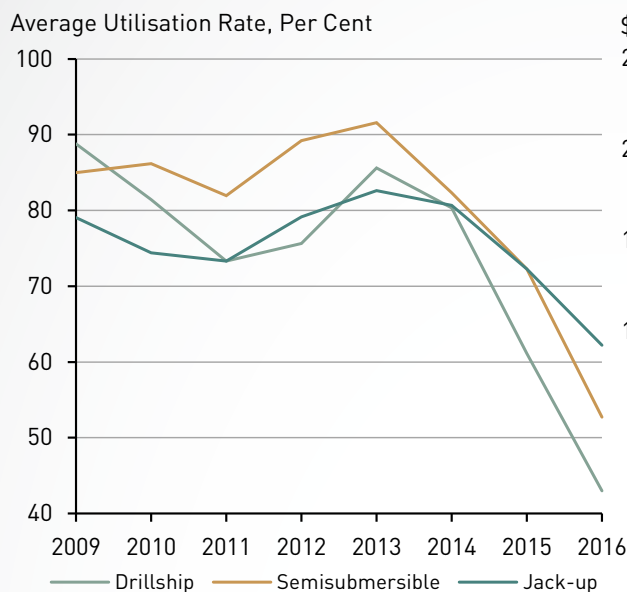
Source: Economic Development Board

Output in the M&OE segment fell by 30 per cent in 2016, a steeper contraction than the 18 per cent decline in 2015. Weak oil prices since the second half of 2014 have weighed on the utilisation of offshore rigs globally, with the overall utilisation rate of such rigs falling for three consecutive years (Exhibit 7). The oversupply situation has adversely affected capital spending on offshore rigs and oilfield & gasfield equipment, thus leading to a drying out of new orders for the local yards. For instance, new orders secured by two major local yards in the first three quarters of 2016 amounted to just \$0.8 billion, 82 per cent lower than the amount of new orders secured over the same period in 2015, and also lower than the \$1.5 billion secured in the first three quarters of 2009 during the height of the Global Financial Crisis (Exhibit 8). At the same time, several requests for deferments in the delivery of offshore rig projects over the past two years have had a further dampening effect on the output of the local yards.

On a brighter note, the aerospace segment lent support to the transport engineering cluster, expanding by a healthy 8.1 per cent in 2016. Production activity in this segment was lifted by higher volumes of aircraft and engine maintenance, repair and overhaul (MRO) works.⁵ Besides MRO activities, some aerospace companies have also diversified into adjacent areas such as cabin services and aircraft refurbishment.

⁴ Such firms may also be found in the machinery & systems segment (e.g., firms that manufacture hydraulic equipment).
⁵ For instance, according to press reports, Singapore Technologies Aerospace – a leading, independent MRO player – secured \$2.0 billion in new orders in 2015 and another \$2.6 billion in 2016.

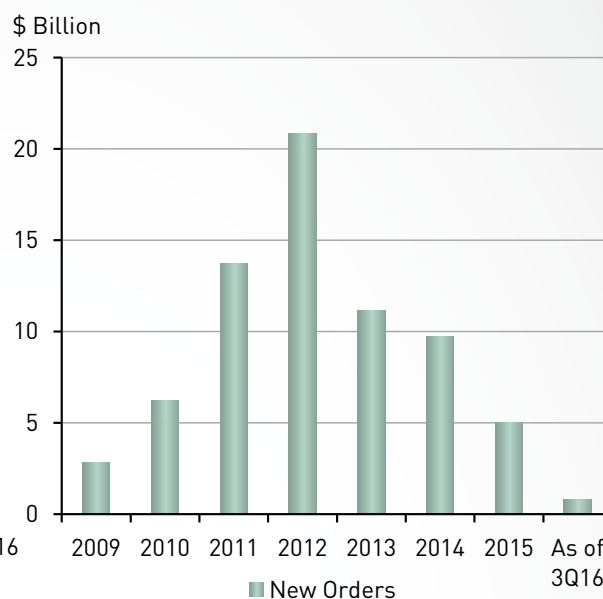
Exhibit 7: Utilisation rate across the different types of offshore rigs plunged further in 2016...



Source: Riglogix

Note: Drillships and semisubmersibles include rigs that can operate in water depth of 5,000 ft and more, while jack-up rigs include independent leg cantilevers of all types.

Exhibit 8: ...weighing on new orders secured by two major local yards



Source: Keppel Offshore & Marine and Sembcorp Marine

Similarly, the general manufacturing and chemicals clusters weighed on overall manufacturing growth in 2016

The output of the general manufacturing cluster fell by 2.5 per cent in 2016, extending the 2.0 per cent decline in 2015, on the back of contractions in the printing (-15 per cent) and miscellaneous industries (-4.4 per cent) segments. The weakness in the printing segment stems from the structural decline in the demand for traditional print media as digital media continues to displace print products. As for the miscellaneous industries segment, its poor performance was due in part to the drop in demand for construction-related materials in tandem with the slowdown seen in construction activities. On the other hand, the food, beverage & tobacco segment expanded by 3.7 per cent, supported by healthy export demand.

The chemicals cluster contracted by 0.9 per cent in 2016, reversing the expansion of 3.9 per cent in 2015. This was due to the petrochemicals segment (-10 per cent), where output levels were dampened by major plant maintenance shutdowns. By contrast, the other segments of the cluster expanded. In particular, the other chemicals segment grew by 8.2 per cent on the back of healthy demand from the region for fragrances used in personal and household care products. Similarly, the specialty chemicals segment expanded by 1.7 per cent, with output growth underpinned by a higher production of mineral oil additives.

Despite the pick-up in output in the manufacturing sector, employment in the sector was weak in 2016

Although the manufacturing sector as a whole expanded in 2016, manufacturing employment fell by an estimated 15,700. This seeming divergence can largely be explained by the uneven performance of the different clusters within the sector. First, the bulk of the employment decline in the sector occurred in the M&OE segment – a segment which has seen prolonged weakness in production activities due to low oil prices. The weak performance of precision engineering firms that support the global oil & gas industry also had an adverse impact on employment in the precision engineering cluster. Second, manufacturing output growth in 2016 was concentrated in segments such as semiconductors and pharmaceuticals. In general, the firms in these segments are highly productive, relying heavily on automated manufacturing processes, which allow them to ramp up production significantly without a corresponding increase in manpower.

While the near-term outlook for the manufacturing sector has improved, growth will remain uneven across the manufacturing clusters and segments

The near-term outlook for the manufacturing sector has improved, given the strong momentum seen in the fourth quarter of 2016. However, growth will be uneven across clusters and segments within clusters. Segments such as semiconductors and machinery & systems are likely to continue to expand on the back of healthy global demand for semiconductors and semiconductor manufacturing equipment. Capacity expansions in the semiconductors segment will also provide a further boost to electronics output in 2017. On the other hand, the M&OE segment and to a lesser extent the precision modules & components segment are likely to continue to face headwinds as the oversupply in offshore oil rigs and lacklustre capital spending by major oil players will weigh on external demand. Similarly, continued weak demand for print products and construction-related materials is likely to adversely affect the printing and miscellaneous industries segments of the general manufacturing cluster.

Over the medium term, the manufacturing sector is expected to remain a key pillar of our economy, at around 20 per cent of nominal GDP, in line with the recommendation of the Committee on the Future Economy. In this regard, MTI and EDB will continue to work towards strengthening Singapore's manufacturing base and developing capabilities in areas such as industrial data analytics and advanced manufacturing technologies. These efforts will in turn help to open up new growth opportunities within the sector.

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