Computer Aided Engineering Software
Information Technology Sector

Investment Thesis

Favorable US economic conditions as well as an expected increase in global research and development spending have positioned the computer aided engineering software industry for growth in 2015. However, uncertainty in the overall global economy could drive down overseas revenues. As well, an increasing popularity in open-source CAE software could steal market share from competing companies in the industry. Therefore, we recommend an industry rating of market weight for the computer aided engineering software industry.

Drivers of Thesis

- New pricing models and Cloud-based software as a service could expand customer base. These new pricing models could appeal to small and medium sized businesses that previously couldn’t afford the perpetual licenses.
- The growth of the Internet of Things has made products more complex which require companies to have CAE software to lower costs of design and speed time to market.
- An increase in global research and development spending will drive sales in the CAE software market.

Risks to Thesis

- Companies within the industry have overseas sales account for a large percentage of revenue. Strengthening of the US economy and of the US dollar will drive revenues from foreign sales down.
- Open-source CAE software is becoming more popular because of the lower over-all cost of ownership. Open-source software could affect growth of the CAE software market.

Top Companies by Market Cap (B)

- Autodesk (ADSK) $13.98
- ANSYS (ANSS) $7.74
- Synopsys (SNPS) $7.12
- Cadence (CDNS) $5.27
- PTC (PTC) $3.99
- Mentor Graphics (MENT) $2.91

Peer Company Statistics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Autodesk</th>
<th>ANSYS</th>
<th>Synopsys</th>
<th>Cadence</th>
<th>PTC</th>
<th>Mentor Graphics</th>
<th>Sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price/Earnings (ntm)</td>
<td>23.1</td>
<td>17.3</td>
<td>14.2</td>
<td>21.1</td>
<td>10.9</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>PEG (ntm)</td>
<td>1.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>ROE</td>
<td></td>
<td>10.93%</td>
<td></td>
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<tr>
<td>Net Profit Margin</td>
<td></td>
<td>14.17%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign Sales % of Rev</td>
<td></td>
<td>58.2%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D % of Rev</td>
<td></td>
<td>27.4%</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Revenue/Employee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$259K</td>
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12 Month Performance

The computer-aided engineering software industry provides software that supports engineering analysis tasks. The CAE software performs tasks such as electronic design, mechanical design, thermal analysis, and fluid flow analysis. CAE software is used in a variety of industries including, but not limited to, automotive, electrical and electronics, industrial machinery, aerospace and defense, and consumer products.

Important disclosures appear on the last page of this report.
The software industry as a whole is poised for growth this year. Global software spending is expected to increase 6.2% in 2015. The computer-aided engineering (CAE) software industry is expected to outpace the entire software industry with an 11.18% CAGR from 2012-2016.

New trends forming in the software industry could potentially increase revenues for CAE software companies. Customers are demanding new pricing models, such as periodic payments and pay-as-you-go. Another trend is the increase in cloud computing, especially software as a service (SAAS). SAAS applications and new pricing models will allow CAE software companies to access a new customer base in the small and medium sized business sector who previously couldn’t afford the large perpetual up-front license fees.

Spending within the CAE industry should increase this year with global research and development spending expected to increase at a 6.38% CAGR through 2018. Economic factors such as low unemployment rates and low interest rates create a favorable environment for growth within the industry. Low unemployment should increase license revenue growth. Low interest rates should increase acquisition activity thereby expanding company portfolios. However, most companies in the CAE industry have a high percentage of sales from overseas. The strengthening of the US dollar could drive revenues down due to the high percentage of foreign sales. Also, an increasing threat of open-source CAE software could affect growth in the market. For these reasons, we recommend a market weight rating for the application software industry in 2015.

Cloud-based Software as a Service

Application software is seeing large growth in cloud-based software as a service. The dominant companies within the industry are making acquisitions to position themselves within the cloud computing sub-industry. While SAAS is a much smaller market than traditional packaged software, $24 billion to $343 billion in 2012, the projected growth rates for the SAAS segment are much higher than the growth for traditional software. The worldwide commercial, non-custom, application software
is expected to grow at a compound annual growth rate (CAGR) of 5.3% from 2012 to 2017. The SAAS market is expected to grow at a 21% CAGR over the same period. (4)

SAAS has many benefits to traditional packaged software. SAAS applications can be run on any computer or device, any time and anywhere with an Internet connection. SAAS applications are subscription based and offer lower initial costs since there are no license fees. Also, the SAAS provider manages the infrastructure so there are lower costs for hardware, software and personnel for the customer. Many firms in the application software industry will implement a pure cloud-based solution for customers. While others will implement a hybrid model, mixing cloud services with in-house computing.

Alternative Pricing Models

Customers are starting to quantify how software contributes value to their organization by measuring where, when, how much, and how well software is used. Customers are focusing on the value software adds and this is reducing their willingness to pay large, up-front license fees for software that supports low-value processes or for software that is rarely used. As a result, software developers are creating alternative pricing and delivery models. In additions to the traditional up-front perpetual license fees, software vendors are offering term licenses, which are valid for only a certain amount of time. Another option is the previously discussed SAAS pricing model where customers essentially rent the software on a “pay-as-you-go” subscription plan. The new models are using periodic payments. The new pricing models will affect software developer’s revenue recognition, cash flow, and financing. (5)

Internet of Things

More and more products are combining mechanical and electrical parts with sensors, microprocessors, and connectivity. These smart, connected products have created the “Internet of things” (IoT) where devices can transmit information offering greater reliability and new functionality. The IoT is growing significantly as consumers and industries are beginning to see he benefits of connecting inert devices to the Internet. The number of “smart” devices is expected to increase to over 25 Billion by the year 2020. The worldwide market for IoT devices is expected grow at a 20.7% CAGR from $1.9 trillion in 2013 to $7.1 trillion in 2020. (7)

Global R&D Spending Growth

The global GDP is expected to increase at a 6.38% CAGR from $77,609 billion in 2014 to $99,409 billion in 2018. (8) According to a Battelle research study, global research and development spending as a percentage of GDP is 1.80%. (2) This equates to global R&D expenditures increasing from $1,397 billion in 2014 to $1,789 billion in 2018. The automotive industry alone accounted for 16.2% of global R&D spending in 2014. (9) The R&D spending for the automotive industry is expected to
increase at a 6.23% CAGR from $66.8 million in 2014 to $96 million in 2020. (10)

Over 80% of the global research and development spending is in the United States, China, Japan, and all of Europe. The United State R&D spending was expected to increase from $450 billion in 2013 to $465 billion in 2014. As a percent of global R&D spending, the Asia share continues to increase, accounting for 37.0% in 2012 to 39.1% in 2014. Most of this growth is driven by China. China and the U.S. are both expected to reach $600 billion in research and development spending by 2022. By 2018, China is expected to surpass all of Europe’s R&D spending. By 2022, China is expected to surpass U.S. R&D spending. European gross expenditures on R&D have remained relatively flat from 2012 to 2014 at $350 billion, $349 billion, and $351 billion, respectively. This trend is expected to continue for the European countries. (2)

Open-source Software

Open-source software is available free on the Internet. Vendors charge fees for maintenance, support, and customization. Because the software is free, the costs of ownership are generally lower than traditional software solutions. Linux has been the market leader for open architecture software and it is giving momentum to the open-source software movement. The Linux operating system is an open-source software alternative to Microsoft’s Windows. Revenue’s for the open-source system infrastructure market are expected to increase at a CAGR of 23% through 2017. Microsoft’s Windows infrastructure is projected to rise only at a CAGR of 9.3% through 2017. (11)

INDUSTRY COMPETITION

Companies in the CAE software industry are in a niche market and offer specialized products and services. The main way companies compete with one another is by expanding their product capabilities through internal research and development and by acquiring technologies or other companies that complement their current product portfolios.

The vast majority of costs and expenses from companies within the industry are spent on research & development and sales & marketing. Of the top competing companies, R&D expenses average 28.48% of the overall company expenses. (12) Not all of these expenses go into pure new product development. Along with developing new functionality and features, a significant portion of the R&D cost is spent testing existing software on different system architectures. However, the R&D expense could give insight into future revenues. Within the top companies of the industry, there is a strong correlation between the percentage increase in R&D expense from one period to the next and the percentage increase in revenues during that same period.
Companies within the industry must have large R&D expenses due to product maturity and obsolescence. When new computer hardware or new operating systems are developed, many times software applications must be updated so they function properly on the new platforms.

On average, sales and marketing expenses account for 35.81% of expenses for the top competing companies within the industry. Companies invest large amounts in sales and marketing in order to create strong customer bases. Having a strong customer base makes switching costs very high. By constantly improving their products and services through R&D and by establishing a strong customer base, companies make it difficult for small companies and start-ups to penetrate existing markets. A constant presence of sales and marketing personnel also discourages larger customers from switching to competitors.

The software industry is a fast-paced industry and getting products to market quickly is vital to a firm’s success. Often times, obtaining a new software technology through merger or acquisition is more attractive than developing it organically through internal research and development. Small companies that have developed an innovative product are prime acquisition targets for larger firms.

The number of mergers and acquisition in the software industry is trending upwards the last few years. In 2014, there were 1840 transactions worth approximately $120 Billion. Competing companies within the CAE software industry have spent an average of 10.8% of revenue on acquisitions from 2009 to 2014. This trend looks to continue as companies have large amounts of cash and are continually expanding their product offerings.

![Peer Company Average % of Revenue spent on Acquisitions](image)

**Peer Comparisons**

<table>
<thead>
<tr>
<th>FY 2014</th>
<th>Sales (M)</th>
<th>Market Cap (B)</th>
<th>Net Profit Margin</th>
<th>P/E (ntm)</th>
<th>Debt/Equity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autodesk</td>
<td>2,274</td>
<td>13,983</td>
<td>10.06%</td>
<td>53.1</td>
<td>33.6%</td>
</tr>
<tr>
<td>Synopsys Inc</td>
<td>2,057</td>
<td>7,123</td>
<td>12.59%</td>
<td>16.3</td>
<td>10.3%</td>
</tr>
<tr>
<td>Cadence</td>
<td>1,581</td>
<td>5,268</td>
<td>10.05%</td>
<td>17.9</td>
<td>51.8%</td>
</tr>
<tr>
<td>PTC</td>
<td>1,357</td>
<td>3,996</td>
<td>11.81%</td>
<td>14.6</td>
<td>70.8%</td>
</tr>
<tr>
<td>Mentor Graphics</td>
<td>1,156</td>
<td>2,912</td>
<td>13.28%</td>
<td>12.5</td>
<td>18.5%</td>
</tr>
<tr>
<td>ANSYS</td>
<td>936</td>
<td>7,740</td>
<td>27.21%</td>
<td>24.2</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

![Software Industry M&A](image)

*Source: Berkery Noyes (13)*

Of the competing companies in the computer aided engineering software industry, Autodesk is the largest with $2,274 million in sales in fiscal year 2014. Most companies have a net profit margin between 10% and 14% except for ANSYS who consistently has had a net profit margin above 25% since 2009. Most of the companies have relatively normal P/E multiples when compared to the technology industry as a whole.
However, ANSYS has a higher than average P/E ratio of 24.2 and Autodesk leads this category with an extremely high P/E ratio of 53.1.  

Debt-to-Equity

This metric is excluding off balance sheet operating leases from the debt calculation. ANSYS leads the peer group in this category having no debt on its balance sheet. Synopsys has a low debt to equity ratio of 10.3%. Within this peer group, Cadence and PTC have high debt to equity ratios of 51.8% and 70.8% respectfully.  

Research and Development

Research and development is an essential expense for companies within the industry. Cadence leads this peer group with 38% of its revenue going towards R&D in 2014. ANSYS and PTC lag the group with 17.6% (FY 2013) and 16.7% of revenue, respectively, going towards research and development.  

International Sales

A large portion of all competing companies sales come from overseas. All companies have international sales greater than 50% of revenue. ANSYS leads the way in this category, consistently having more than 66% of sales coming from overseas from 2009 to 2013. Autodesk is a close second having international sales ranging for 62% to 66% from 2009 to 2014. With the US economy strengthening and the dollar getting stronger, a higher percentage of international sales will decrease revenues when compared to peers.  

Marketing and Sales

Sales and marketing will help generate new sales and help keep existing customers. ANSYS does not break apart Sales and Marketing expenses from total SG&A expenses. Of the remaining competing companies, Autodesk is consistently the leader in this category with marketing and sales as a percent of revenue above 37% from 2009 to 2014. Synopsys Inc. consistently has the lowest marketing and sales as a percent of revenue ranging from 24.6% to 22.0% from 2009 to 2014. While the total amount spent on sales and marketing is increasing each year, the amount spent as a percent of revenue is decreasing for all peer companies.  

Deferred Revenue

Deferred revenue is a good indication of future trends in revenue for a company. If deferred revenue is growing at a faster rate than overall sales, it generally indicates future growth for the company. The amount of deferred revenue varies considerably among the peer companies. Mentor Graphics consistently has deferred revenue as a percent of revenue of around 20%. Synopsys Inc. is
consistently above 40% of deferred revenue as a percent of revenue. Autodesk has a consistent upward trend of increasing deferred revenue as a percent of revenue. (12)

**Revenue/Employee**

![Revenue generated per employee chart]

The peer companies vary considerably in size. Synopsys is the largest with 9,436 employees in 2014. ANSYS is the smallest with 2,700 employees. Ideally, a company wants the highest revenue per employee as possible, as it denotes higher productivity. Companies with consistent levels of high revenue per employee usually indicate a company with solid management. When computing the amount of revenue generated per employee, ANSYS is consistently the most efficient generating more than $323,000 per employee each year from 2009 to 2014. PTC, Synopsis, and Mentor Graphics were the least efficient in 2014 generating $211,000, $218,000, and $222,000 per employee. (12)

**ECONOMIC OUTLOOK**

Economic drivers for the computer aided engineering software industry are GDP growth, unemployment rates, interest rates, and strengthening of the U.S. dollar.

We expect a GDP growth rate of 3.40% over the next six months. One of the four primary components of the GDP is corporate spending. As corporations increase their spending, we would expect the CAE software industry to have growth that has a positive correlation with the growth in GDP.

Interest rates have a negative impact on mergers and acquisitions. Higher interest rates increase acquisition costs, which lower the number of overall acquisitions. We expect the 10-year Treasury Bond Yield to remain around 2.30% for the next six months, increasing slightly to around 3.10% over the next two years. These low interest rates should help drive continued acquisitions.

Sales in the CAE software industry have a negative correlation with the unemployment rate. As companies hire more people, more software seat licenses will be required which can help drive sales. We expect the unemployment rate to continue to decline to 5.41% in the next six months.

![Unemployment Rate chart]

For U.S. companies that have significant overseas sales, the strengthening of the U.S. dollar could have a negative impact on earnings. In the next six months, we expect the dollar to continue to strengthen against the Euro and Yen. All the competing peer companies in the computer aided engineering software industry receive more than 50% of their revenue from international sales. The industry could see lower earnings if the dollar continues to strengthen. (9)
Exchange rates also affect merger and acquisition activity. A strong currency makes it less expensive to acquire foreign companies. The US dollar strengthening against the Euro and Yen could help drive more acquisitions of overseas companies by US corporations.

INVESTMENT POSITIVES

- Cloud-based software as a service and alternative pricing models could help CAE companies gain users and sales from small and medium sized businesses. The new pricing models could help the smaller companies purchase the software when in the past they couldn’t afford the large up front perpetual licenses.

- The Internet of Things could help drive sales in the CAE software industry. The number of “smart” devices is expected to increase to over 25 Billion by the year 2020. (6) These devices are more complex than traditional product and software simulation can help in the design and testing of these devices.

- Computer aided engineering software is an essential component of research and development. The expected increase in global research and development spending should drive an increase in revenues for the CAE industry.

INVESTMENT NEGATIVES

- Companies within the industry have overseas sales account for a large percentage of revenue. Strengthening of the US dollar will drive revenues from foreign sales down.

- Open-source CAE software is becoming more popular because of the lower over-all cost of ownership. Open-source software could affect growth of the CAE software market.

VALUATION

The software industry as a whole is poised for growth this year. Global software spending is expected to increase 6.2% in 2015. (16) The CAE software industry is positioned well for future growth as well. New pricing models will give companies access to a new customer segment that previously couldn’t afford the traditional perpetual licenses. As well, an increase in global R&D spending will increase sales for the industry.

Companies positioned well within the CAE industry have adapted to customer demands for different pricing models. Well-positioned companies have continued to expand their product offering through continued research and development and thought mergers and acquisitions.

Three companies that seem especially well positioned are Autodesk, Synopsys, and ANSYS. Autodesk consistently invests large amounts in marketing and sales and research and development. In the last three years they continued to expand their product offering through acquisitions. They completed 23, 13, and 15 acquisitions in 2012, 2013, and 2014, respectfully. Also, in the last five years, Autodesk has a consistent upward trend of increasing deferred revenue, which generally indicates future growth. Autodesk may not be an attractive investment since it trades at a very high P/E ratio of 53.1.

Synopsys is positioned well for the future. Of all the peers in the group, they have the lowest percentage of foreign sales. This makes them very attractive if the US economy continues to outpace the global economy. They consistently have deferred revenue as a percent of revenue above 40%, with 49% in 2014. This indicates future growth in revenues. They have a low debt to equity ratio of 10.3%. They have high R&D expenses when compared to their peers. In 2014, they had R&D expenses at 34.9% of revenue. Only Cadence spends more on R&D as a percent of revenue.

ANSYS is also positioned well for the future. They have consistently been very efficient generating more than $323,000 of revenue per employee for the last five years. This is an indication of good management. Also, over the last five years they have held large deferred revenues of approximately 35% of revenue, which indicates they have consistent growth. They also carry no debt on their balance sheet. In 2014, they had a net profit margin of 27.2%, which is well above the peer companies within the industry.
KEYS TO MONITOR

The American economy is on an upswing while the global economy is not. A common characteristic of CAE software companies is the majority of revenues come from foreign sales. The growing US economy and strengthening of the dollar will decrease income from foreign sales. The condition of the global economy should be watched. If it continues struggle while the US economy thrives, profitability of the CAE industry could decline.

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