Strategic marketing plan to develop Synopsys's New signal integrity simulation solution product suite

Marketing High Technology Products Project

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Contents[1]

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[1] Format from Marketing plan template by professor Anirudh Dhebar

EXECUTIVE SUMMARY

One key differentiator amongst the competitors within the EDA industry is the level of vertical integration that exists within a company to provide a true end to end signal Integrity solution. Cadence has reached this position because of its existing product suite and latest acquisitions such as Sigrity Inc last year. Synopsys has been very successful with it's hspice tool which is considered to be the industry's gold standard [2]for accurate circuit simulation, it is also part of the cutting edge of technology with its FinFet technology, increased productivity and automation in it's system on chip development and verification platforms, its 3D IC solution, and a complete system to silicon verification solution. However it needs to incorporate more advanced 3D full wave electrical/electromagnetic SI/PI analysis in its product offerings along with the next generation system level verification suites which incorporate Transaction level methodology (TLM) versus the traditional RTL (Register level). The assumption for this paper is that in order to stay competitive Synopsys acquires Ansys Inc. Both companies are part of the EDA industry. The report provides details on how should Synopsys modify its current marketing plan and product portfolio to integrate Ansys's flagship technology products. The first step would be to segment demand, following by targeting and positioning of the new product portfolio.

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[2] http://www.synopsys.com/Tools/Verification/AMSVerification/CircuitSimulation/HSPICE/Pages/HSPICE-SIG-2012.aspx

(Discerning) MARKET SENSING

ELECTRONIC DESIGN AUTOMATION INDUSTRY ANALYSIS

The EDA industry is a $2.1billion revenue industry with profits of $292.7million[3]. The industry's key main economic drivers are "demand from semiconductor and circuit manufacturing, # of mobile internet connections, Private investment in computers and software, Demand from computer manufacturing, price of semiconductor and electronic components [4]". Using data for these economic drivers as predictors a regression line model has been created for the response variable revenue of this industry. Please refer to EDA Industry Revenue growth % actual versus regression model predicted chart, Revenue, growth 3D plot chart and regression model plots chart in the Appendix for details.
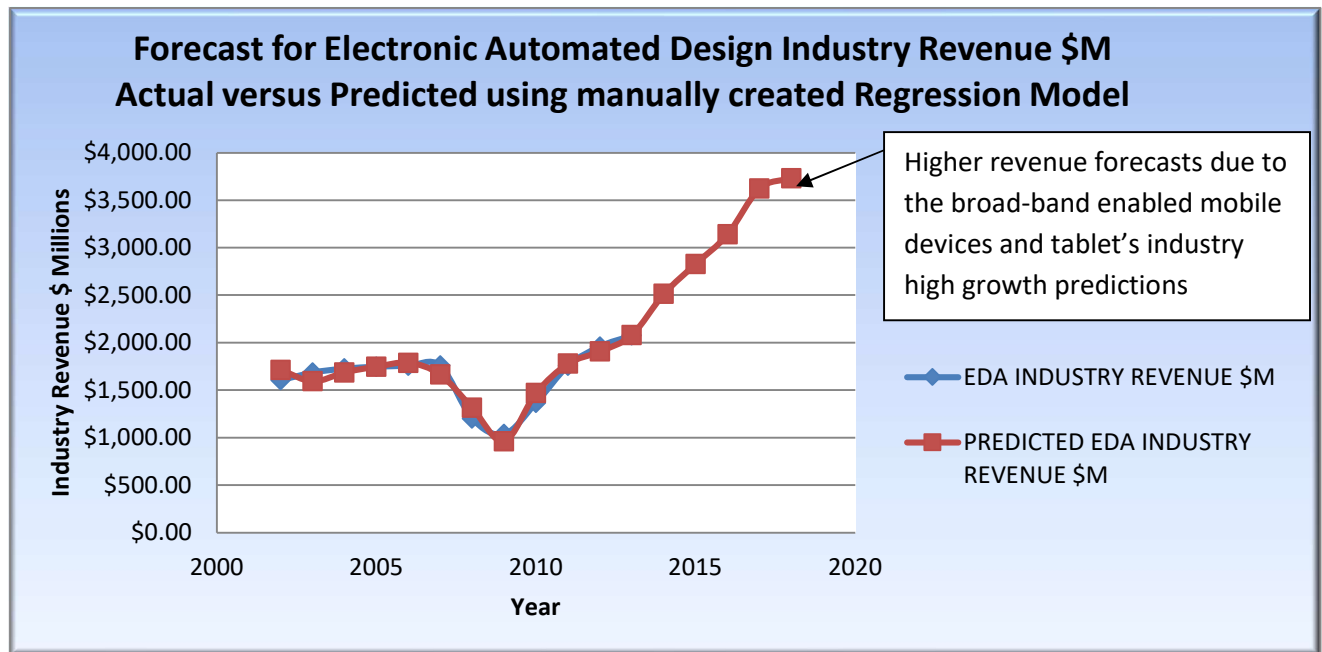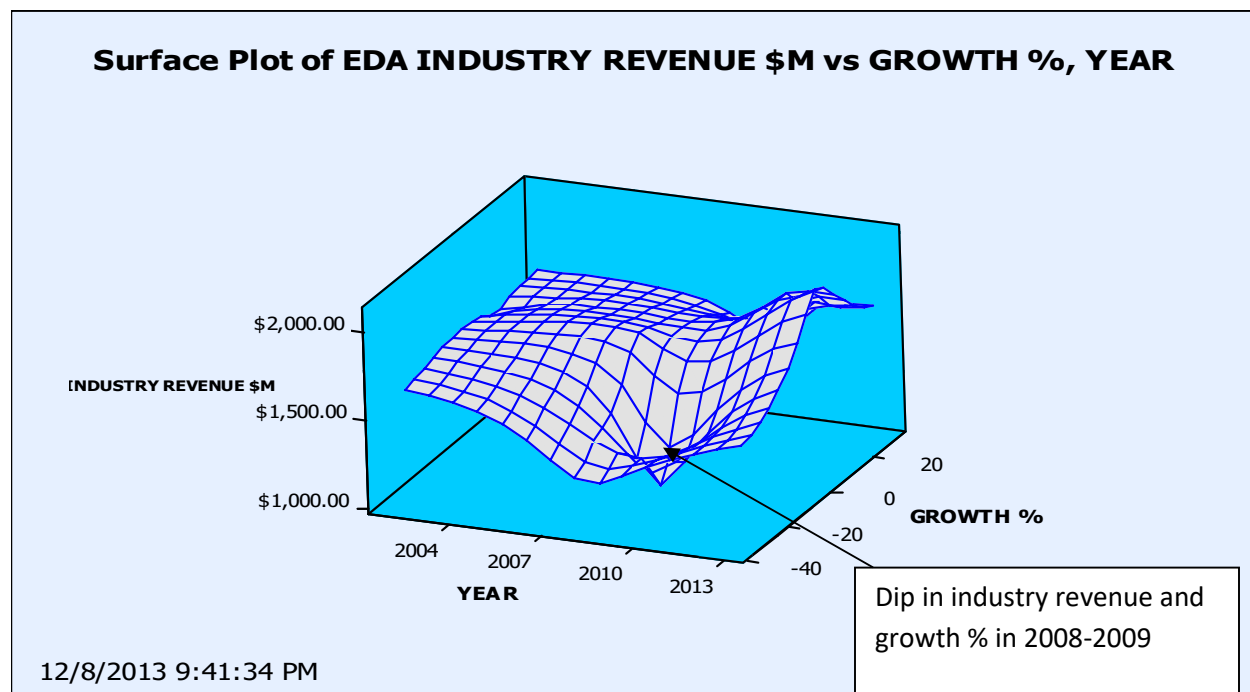

Source: manually created chart based on raw actual revenue data from EDA IBIS report, prediction model created from the regression model described in appendix.

Based on the chart above the industry is overall projected to grow with high revenue forecasts. This is profitable industry to be in. The logic behind this is because as the integrated circuit technology continues to grow and advance due to Moore's law, this will drive demand for EDA software. However the main reason for high growth and revenue projects is because over the next five years in addition to the traditional demand for micro chip technology, broad-band enabled mobile devices such as smart

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[3] EDA industry IBIS report

phones and tablets are expected to drive demand for more advanced microchips. The number of mobile internet connections are expected to grow 7.9% per year on average[4], this states that more customers will adopt these devices. This will add more pressure to EDA software developers to be able to design, verify and simulate more accurately and quicker the various electronic circuits on an integrated circuit leading to the development for new products within the industry.

Surface Plot of EDA INDUSTRY REVENUE $M vs GROWTH %, YEAR

INDUSTRY REVENUE $M

$2,000.00

$1,500.00

$1,000.00

2004   2007   2010   2013

YEAR

20

0

-20

-40

GROWTH %

Dip in industry revenue and growth % in 2008-2009

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Source: manually created chart using raw data from EDA IBIS report.

The industry in the past five years has been affected by the recession as shown above; this is due to the decrease in revenue for the semiconductor industry and decline in private investment in computers and software. In order to keep up with the rapid changing development in technology a common strategy employed within the industry is for firms to acquire smaller firms. The industry has consolidated with number of firms decreasing on average of 2.9% per year. Hence for today industry is relies heavily on the semiconductor and circuit manufacturing industry as its primary demand industry.

SYNOPSYS COMPANY BACKGROUND

Synopsys In provides technology solutions used to develop electronics and electronic systems. It is part of the electronic design automation (EDA) industry that is utilized by engineers to design, create prototypes and test integrated circuits (chips). It's intellectual products (IP) products includes pre-designed RT circuits that engineers use as components of larger chip

designs. It also provides technical services for its products and assists customers in developing electronic systems. Its products and services can be divided into four groups namely Core EDA software, IP and system level solutions for ICs, Manufacturing solutions and professional services. [4]. With a revenue of $1.912 billion and net income of $220 million and a cash flow balance of $415 million in the past twelve months it has the key resources required to bring to market new EDA applications either by investing in research and development or through acquisitions. Synopsy's key competitors are Ansoft LLC, Cadence Design systems and mentor graphics Corp[5] within the EDA industry. In terms of market share and revenue Synopsys is the leading EDA provider as shown in the chart below. Synopsys's customers include integrated circuit design and test manufacturing companies in the semiconductor and computer industry. The key members of the decision making units will include the supply industries such as the computer manufacturing industry the customer demand industries such as semiconductor & circuit manufacturing, circuit board & electronic components industry, demand for mobile and tablet industry and the ever increasing and difficult to meet design metrics for this products due to Moore's law and Koomey's law.
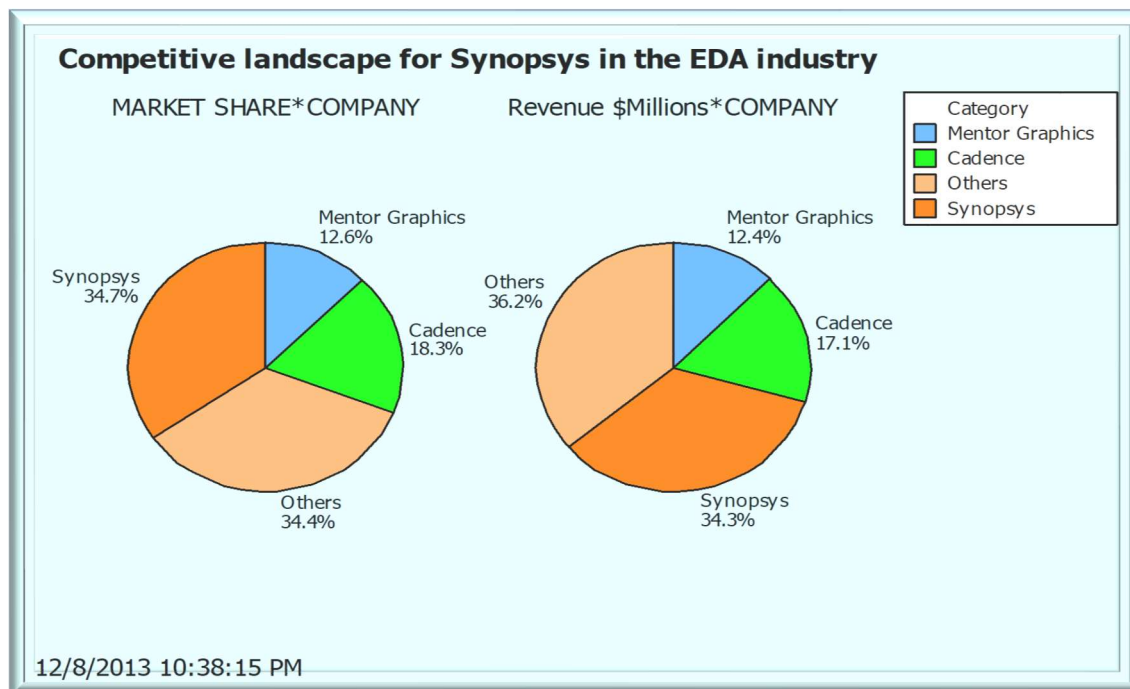
Source: manually created chart using raw data from EDA IBIS report.

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[4] Thomson One Synopsys Inc report
[5] http://finance.yahoo.com/q/co?s=SNPS+Competitors

SYNOPSYS ACQUISTION AND COLLABORATION STRATEGY IN YEAR 2012

The company has a diversified product portfolio through various strategic acquisitions and alliances.

As shown in the chart below in the year 2012 it acquired four firms within the EDA industry. In May of last year by acquiring Rsoft Design group it entered a new demand segment within this industry related to optical solutions by combining its existing imaging and illumination design product with the company's photonics design group. In July 2012 by acquiring Ciranova it was able to help customers reduce time and effort needed to develop transistor level layout on advanced nodes. In October of 2012 it acquired Emulation and verification engineering; it provides emulation platforms for system on chip verifications. In December of 2012 it acquired Spring soft which is located in Taiwan this will provide a higher level of automation in the verification and debug platforms for the IC and hence expedite development schedules[6]. In addition to internal research and development conducted by the company itself Synopsys has also collaborated with various vendors through horizontal integration. Outside of acquisitions Synopsys is committed to developing it product portfolio through collaborations with its vendors and customers. A few examples include alliances with Belgian nano electronics for FinFet technology. It collaborated with ARM Inc to its IP and access to its Cortex –A15 processors. It collaborated with Renesas Electronics to include its RH850 microcontroller software code. Altera an FPGA provider is another example which Synopsys collaborated to increase its customer base.
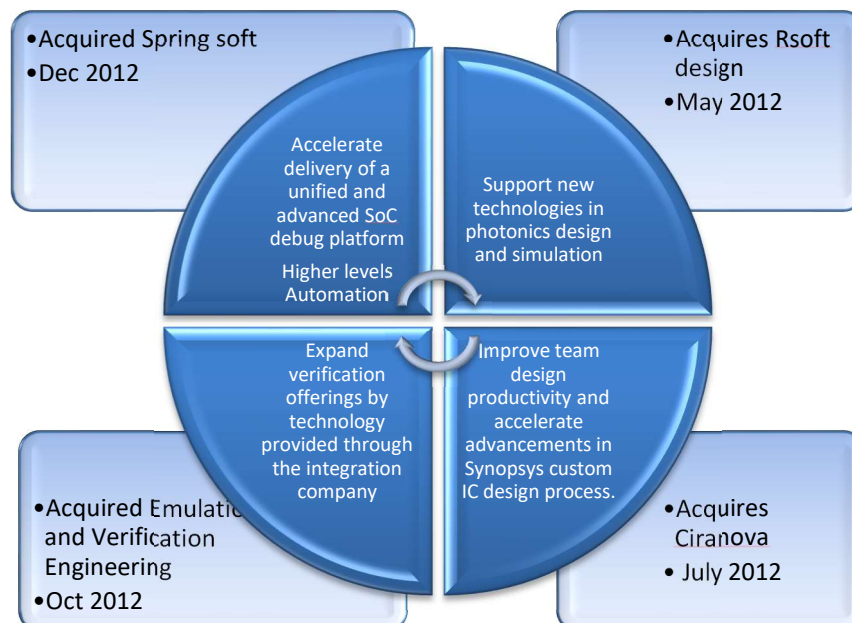
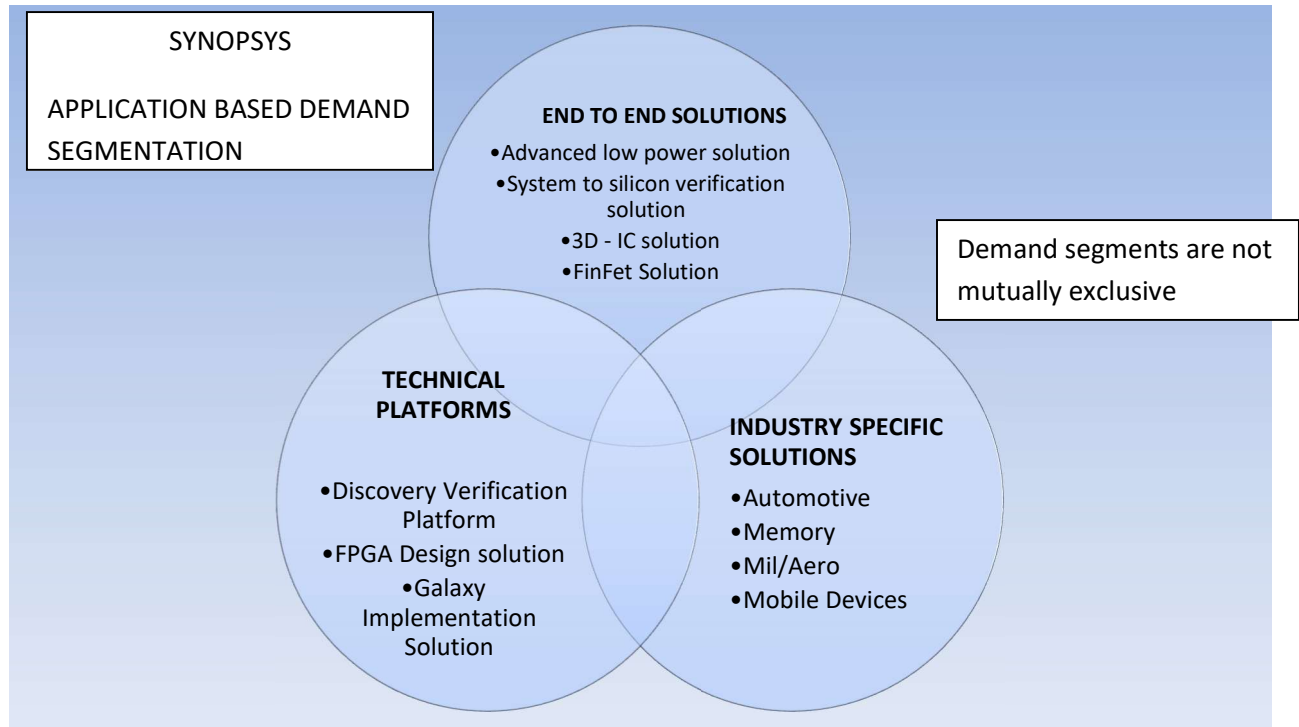*Source: manually created chart, raw data from Market line SWOT analysis for Synopsys*

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[6] Market line SWOT analysis for Synopsys

(Compelling) MARKET ENGAGEMENT

In trying to introduce a new product suite to the Synopsys product suite by acquiring Ansys Inc it is important to understand how the company currently segments and targets its products.

SEGMENTATION, TARGETING AND POSITIONING

The demand is segmented by **applications** described as below[7]:

SYNOPSYS

APPLICATION BASED DEMAND SEGMENTATION

Demand segments are not mutually exclusive

END TO END SOLUTIONS
- Advanced low power solution
- System to silicon verification solution
- 3D - IC solution
- FinFet Solution

TECHNICAL PLATFORMS
- Discovery Verification Platform
- FPGA Design solution
- Galaxy Implementation Solution

INDUSTRY SPECIFIC SOLUTIONS
- Automotive
- Memory
- Mil/Aero
- Mobile Devices

The segments are not mutually exclusive hence the Venn diagram showing overlap of the various products within each demand segment. The tools within the design phase specific tools are applied across all the demand segments. The execution platform is mostly Lynx. There are few products are targeted specifically to an industry e.g automotive and mobile device industry. The design tools are licensed with the technical platforms and/or end to end solution platforms. With the introduction of the product portfolio from Ansys this needs to be re thought. Ansys products are utilized by numerous industries more than Synopsys. Demand segmentation for the merged company should be by industry. Ansys supports numerous industries namely Academic, Aerospace & defense, Automotive, Construction, Consumer goods, Materials and chemical processing, electronics & semiconductor , energy, healthcare,

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[7] Manually generated chart, raw data from http://www.synopsys.com/home.aspx

industrial equipment and rotating and machinery[8]. This would be expanding Synopsys strategy from its current in depth vertical integration expertise to SOC design and verification to a more horizontal integration across numerous industries. Most of the Synopsys products would target the existing synopsys demand segments, however this would not be the case for the Ansys products. Some of the products in Ansys apply directly to existing Synopsys customers such as Ansys HFSS which is a 3D Full wave electromagnetic simulation tool, Ansys SIwave which can be utilized to perform power integrity analysis , Ansys DesignerRF, Ansys Designer SI can be incorporated with Synopysy Hspice tools. These would fall under the technology computer aided simulation tool capability product suite for Synopsys.

MARKETING GOALS AND OBJECTIVES

Growth, increased revenue and market share would be the key goals and objectives for the combined company. Increased market share can be justified to drive the stock price for the combined company higher and hence increase shareholder value. A measurable goal could be to increase stock price of the combined company by 40% within the next 5 years.

MARKETING PROGRAM

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[8] http://www.ansys.com/Industries
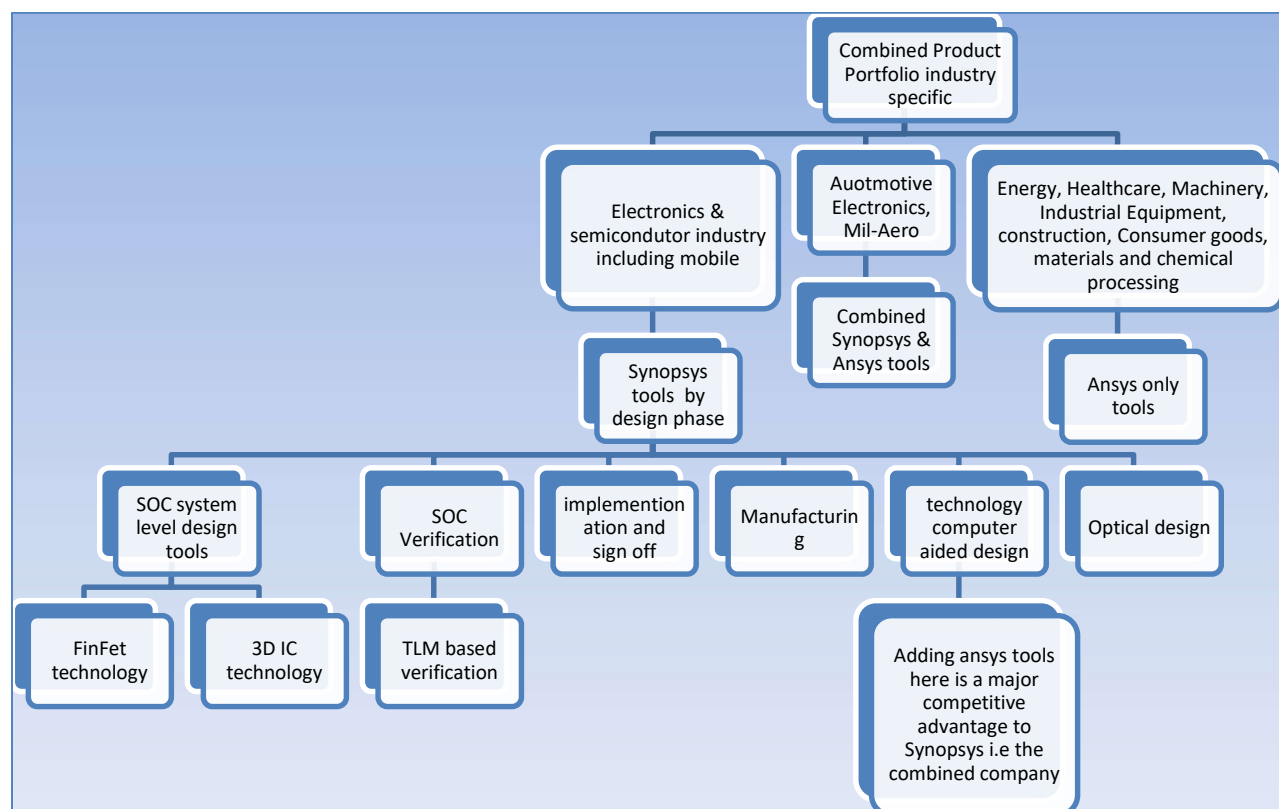
The value proposition for the diverse product portfolio would be targeted per the different demand segment. Through the combination of both companies the value proposition for the electronics and semiconductor industry would be vastly improved due to the combination of the tools from both companies. The chart above shows increased vertical integration in the electronics and semiconductor industry along with increased horizontal integration across industries for the combined tool portfolio.

MARKETING STRATEGY

Demand segmentation would be industry specific. Products would be targeted per application within an industry. Common application products would be targeted across industries. A push approach would be applied for the products specifically in the electronics industry. Ansys and Synopsys are both mainstream companies within the adoption curve[9] as defined by Geoffrey Moore's concept of crossing the chasm. The organizational culture will be combined with the integration of both companies. A new business model will be developed to target more application within an industry based demand segment. Due to the up coming technologies such as FinFET, 3D IC and TLM based verification all supported by Synopsys, there will be a push for consumers to accept the next generation product. The original products outdated will be discontinued as these new technologies are adopted and approved by consumers, hence a disruptive technology chasm will need to crossed not only within the combined company but with customers across industries. The 3D IC technology allows multiple dies to be stacked vertically using through silicon via technology. This will replace the traditional wire bonding process in chip/wafer stacking. The advantages would be increased density and bandwidth along with lower power consumption and a smaller form factor[10]. Due to the always increasing demand for lower power, area and cost for the IC industry constant technology innovation is required. The FinFET technology is considered to be the most radical shift in the semiconductor technology in 40 years [11]. This will affect every industry and company within the semiconductor value chain from customers to foundries. It will be interesting to see how this evolves with time whether the chasm from innovator (3D IC and FinFET technology) to mainstream is crossed or not effectively. If so Synopsys will be the leading company to support these technologies within the EDA industry.

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[9] Six chasms in need of crossing – Anirudh Dhebar
[10] http://www.synopsys.com/Solutions/EndSolutions/3d-ic-solutions/Pages/default.aspx
[11] https://www.synopsys.com/COMPANY/PUBLICATIONS/SYNOPSYSINSIGHT/Pages/Art2-finfet-challenges-ip-IssQ3-12.aspx

APPENDIX

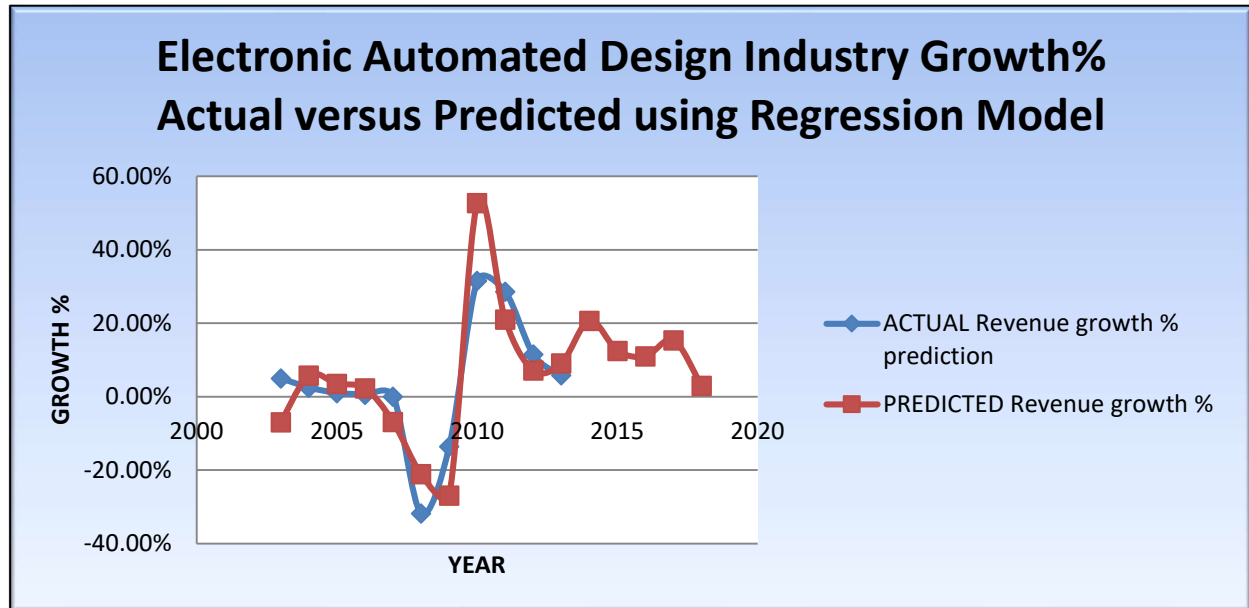## Chart I EDA Industry Revenue growth% actual versus regression model predicted chart

Chart II: Multiple linear regression plots for the EDA industry

Ideally one needs at least 30 observation for the central limit theory to apply for a valid histogram but to do the lack of data, extrapolations are made. No pattern detected in the residual versus fit plot.
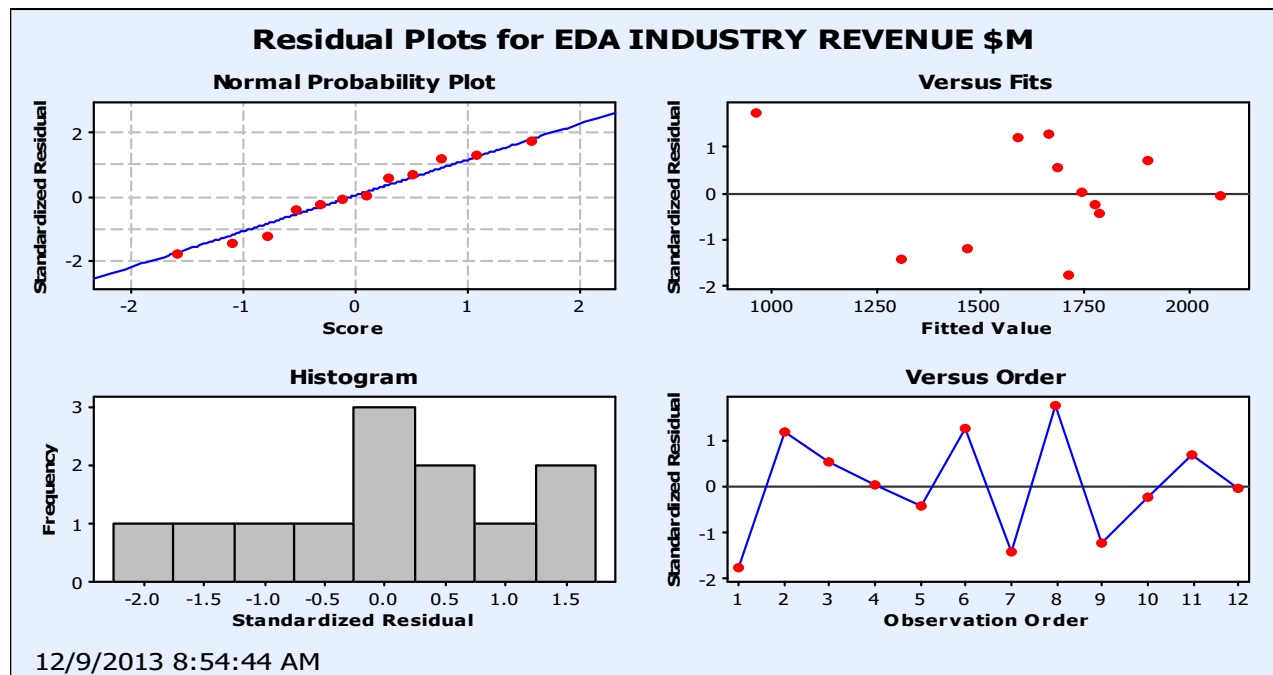
Chart III: Multiple linear regression equation

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The regression equation is
EDA INDUSTRY REVENUE $M = - 10508 + 0.0174 REVENUE FROM SEMICONDUCTOR INDU
+ 5.06 _ OF MOBILE INTERNET CONNECTION
+ 0.00707 $ M PRIVATE INVESTMENT IN COMPU
+ 96.2 PRICE INDEX OF SEMICONDUCTOR


Predictor                            Coef   SE Coef      T      P     VIF
Constant                           -10508      2211  -4.75  0.002
REVENUE FROM SEMICONDUCTOR INDU   0.017368  0.005720   3.04  0.019   1.892
_ OF MOBILE INTERNET CONNECTION      5.058     1.007   5.02  0.002   6.438
$ M PRIVATE INVESTMENT IN COMPU   0.007071  0.001738   4.07  0.005  28.333
PRICE INDEX OF SEMICONDUCTOR         96.20     21.75   4.42  0.003  46.388


S = 95.6562   R-Sq = 93.5%   R-Sq(adj) = 89.8%

Analysis of Variance

Source          DF      SS      MS      F      P
Regression       4  922160  230540  25.20  0.000
Residual Error   7   64051    9150
Total           11  986210



Best fit regression model:
Response is EDA INDUSTRY REVENUE $M

R _ $   $
E       C
V O M   O
E F   P M
N   P R P
U M R I U
E O I C T
B V E E
F I A   R
R L T I
O E E N M
M     D A
I I E N
S N N X U
E T V   F
M E E O A
I R S F C
C N T   T
O E M S U
N T E E R
D   N M I
U C T I N
C O   C G
T N I O
O N N N R
R E   D E
C C U V
I T O C E
N I M T N
Mallows         D O P O U
Vars  R-Sq  R-Sq(adj)      Cp       S  U N U R E
1   55.2     50.8     41.4  210.10  X
1   16.4      8.1     84.3  287.10    X
2   75.3     69.8     21.2  164.42  X X
2   72.8     66.7     24.1  172.79  X       X
3   85.0     79.3     12.6  136.20    X X X
3   78.1     70.0     20.1  164.13  X X   X
4   93.5     89.8      5.2   95.656  X X X X
4   87.3     80.1     12.0  133.69    X X X X
5   94.6     90.0      6.0   94.518  X X X X X
```

An adjusted coefficient of multiple determination Rsq value of 89.8% indicates that the model is good predictor. P test value is valid. Theprice index of semiconductor industry has a high co-efficient value. Most of the co-efficients are positive so any change in these predictors will cause a similar effect for the EDA industry revenue ie. if revenue from semiconductor industry goes up so will the revenue of the EDA industry. Total variation in errors (sum of squares) from the regression line is $0.98M, divided into explained variation of $0.92M residual error or unexplained variation of $64,051. The standard error of estimate (average deviation of data from the fitted linear regression line is $95M. SE Coefficient for each predictor provides the standard of error for each predictor coefficient. Multicollinearity is a problem with this regression model, observe the high value of VIF (variation inflation factors) for the co-efficients between private investment in computer and software industry and price index of semiconductor industry. However when applying best fit iteration using these predictors the ones stated above meet the Cp test.