



## ***VALUE BASED MANAGEMENT: VALUATION AND ANALYSIS ON INFINEON TECHNOLOGIES***

Presented by,  
Ajith Rajan

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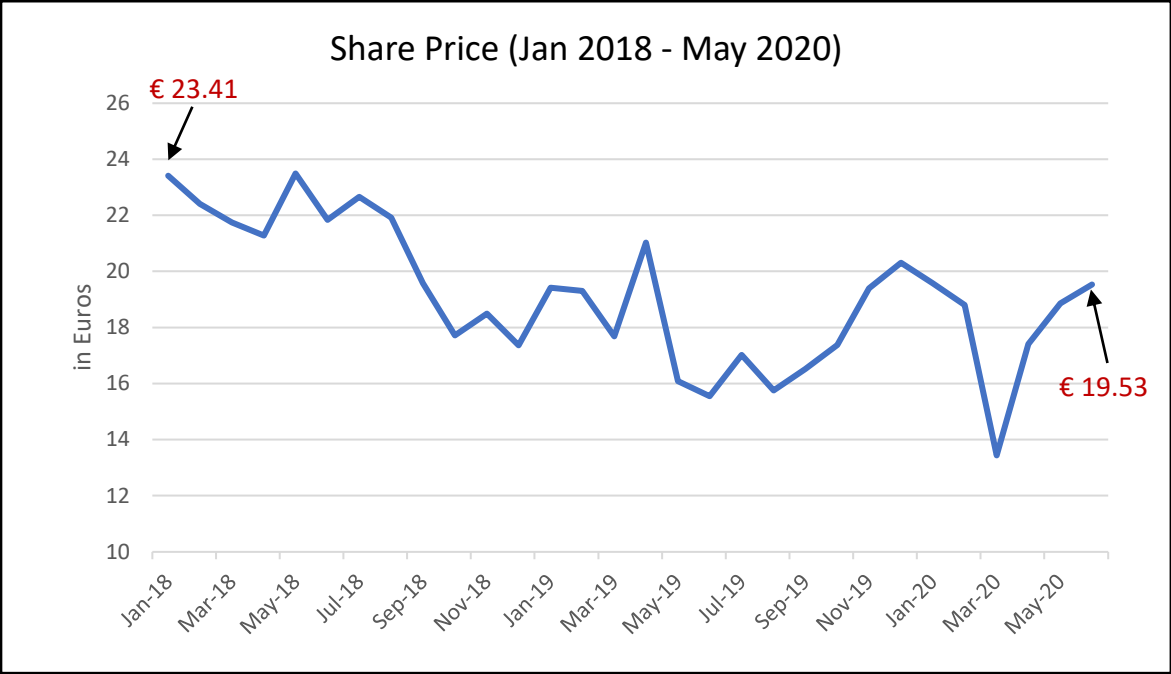
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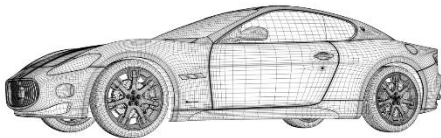
- ✓ German Semiconductor manufacturer founded in 1999
- ✓ CEO : Reinhard Ploss
- ✓ CFO : Helmut Gassel
- ✓ Headquarters : Neubiberg
- ✓ Employees : 47,400 (Nov,2019)
- ✓ Products : Micro Controllers  
Communication ICs  
Power Electronics  
ESD Protection Diodes
- ✓ Website : [www.infineon.com](http://www.infineon.com)



Reinhard Ploss



### Major Segments



Automotive(ATV)



Industrial Power Control (IPC)



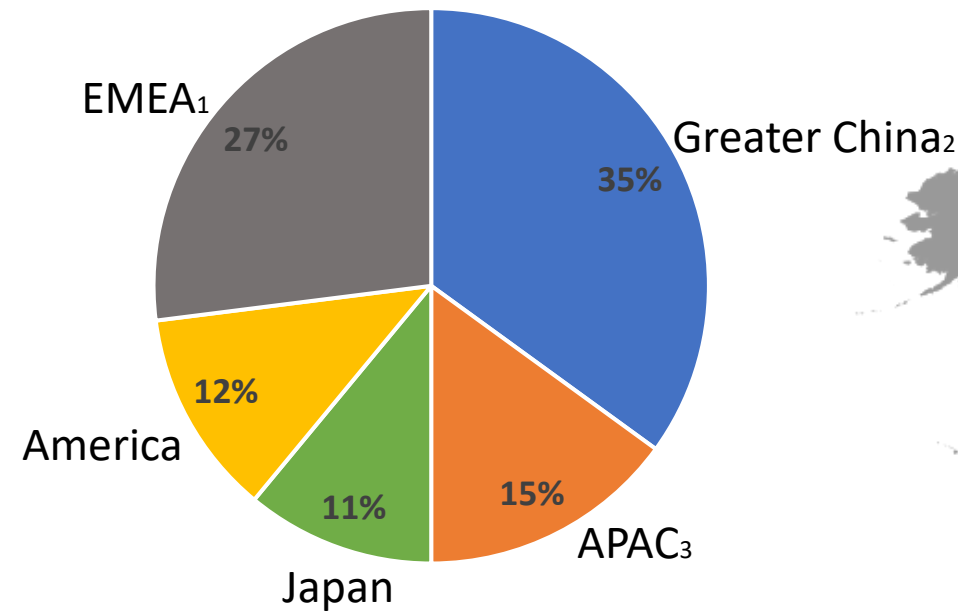
Digital Security Solution (DSS)



Power & Sensor (PSS)

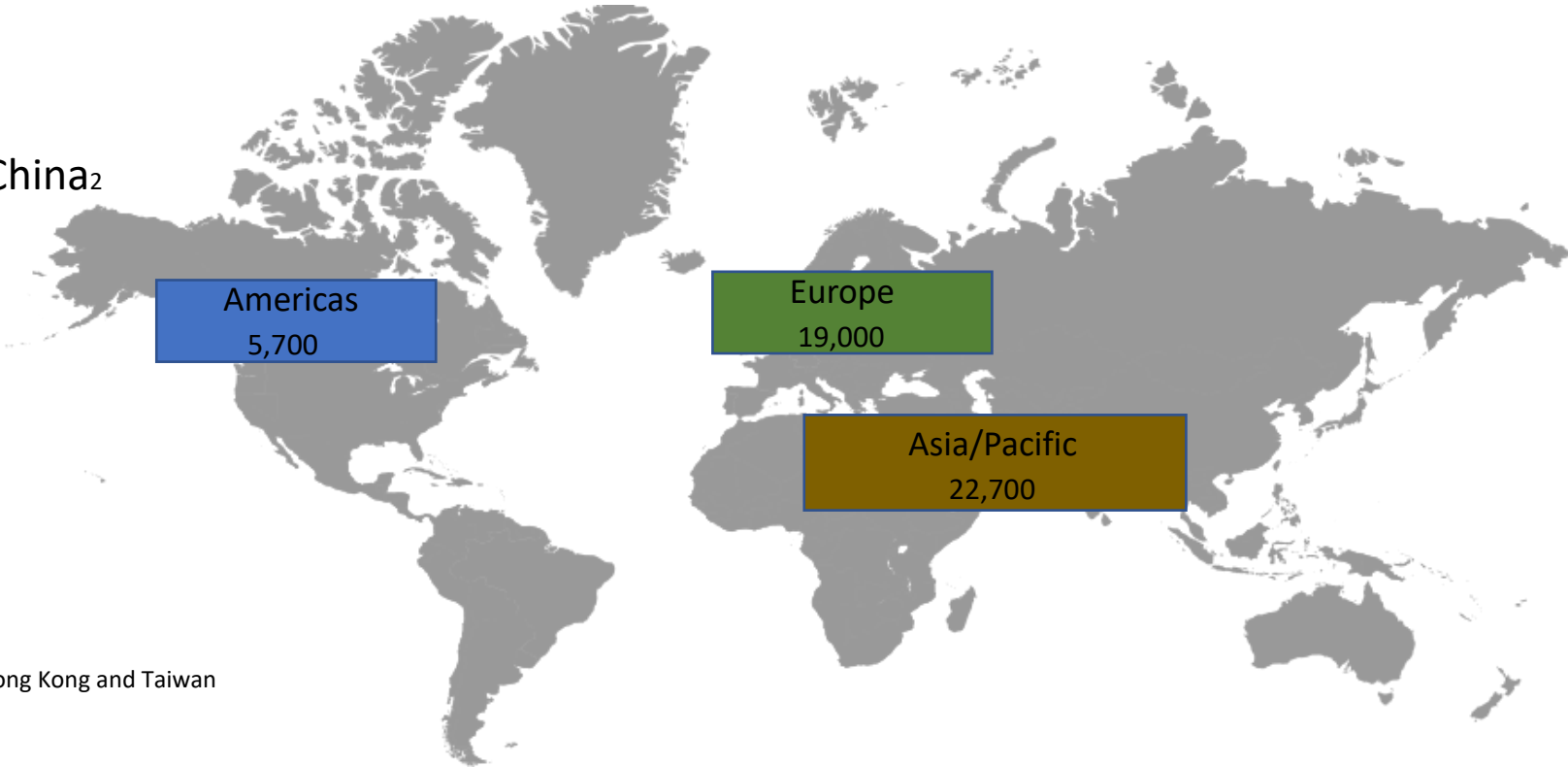
Source: <https://www.investing.com/equities/infineon-tech-historical-data>  
<https://www.infineon.com/cms/en/about-infineon/investor/infineon-at-a-glance/#segments>

Revenue by Region



1. Europe, Middle East, Africa 2. Greater China comprises Mainland China, Hong Kong and Taiwan  
3. Asia Pacific (excluding Greater China)

Employees

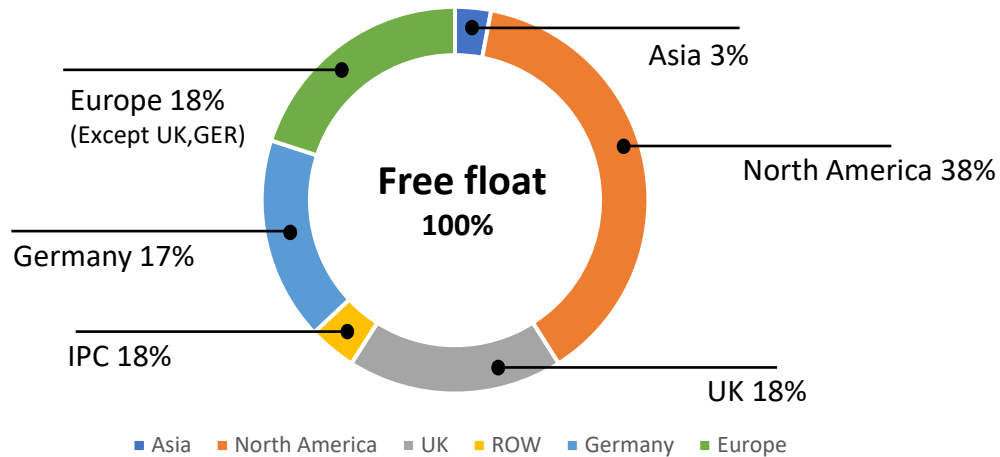


**47,400** employees worldwide  
(as of Nov,2019)





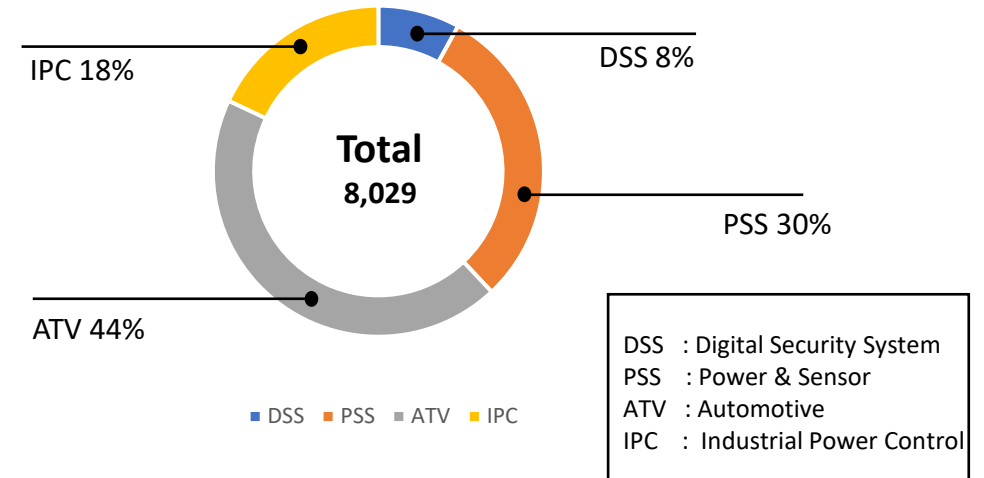
Share Structure(31 Mar 2020,by region)



Three share holders each hold 3% or more of Infineon shares :

- ✓ Black Rock Inc (5.4%)
- ✓ State of Norway (4.9%)
- ✓ Allianz Global Investors GmbH (4.8%)
- ✓ DWS investment GmbH

Revenue Distribution(by Segment)



**ATV** : The company ranks number 1 in radar sensor chips for driver assistance systems.

Global number 1 in Power semiconductors

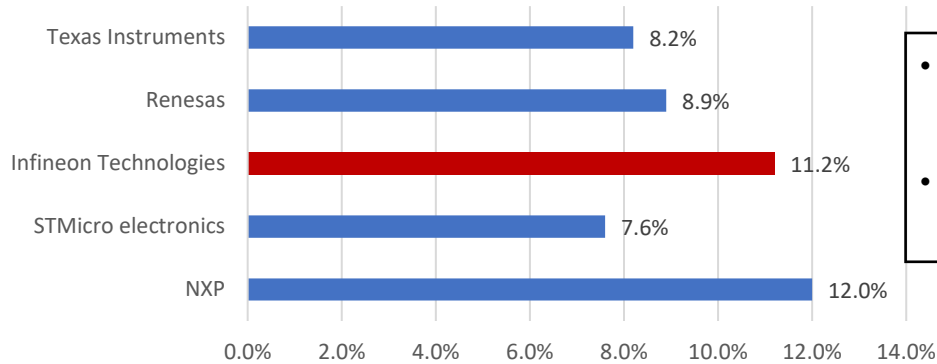
**IPC** : Specialize in the efficient conversion of electric energy.

Core Applications : Solar & Wind, Tractors, Robotics, Charging Stations

**PSS** : Core Applications : Battery Powered applications, charging station, lighting system, power management, mobile devices

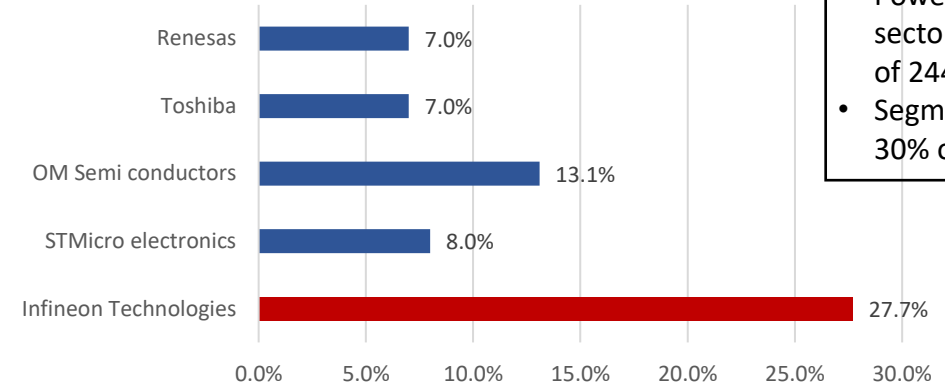
**DSS** : Core Applications : Authentication, Automotive, Governmental ID  
 Mobile communication, ticketing, access control

### Automotive Semiconductor



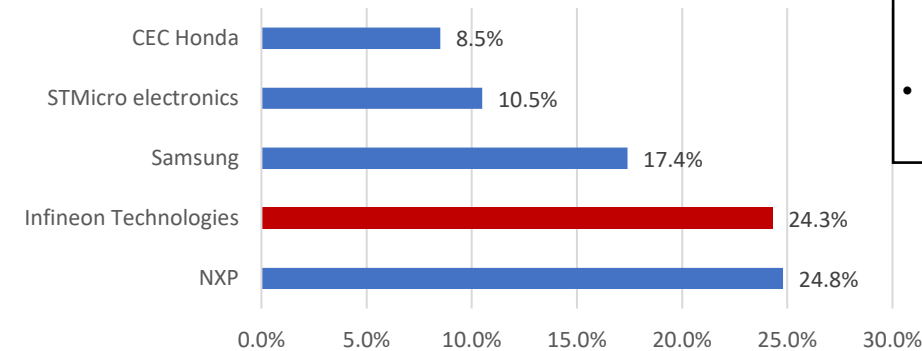
- ATV segment Recorded revenue of 3503mn Euro in 2019
- Segment Contributed 44% of group revenue

### Power MOFSET



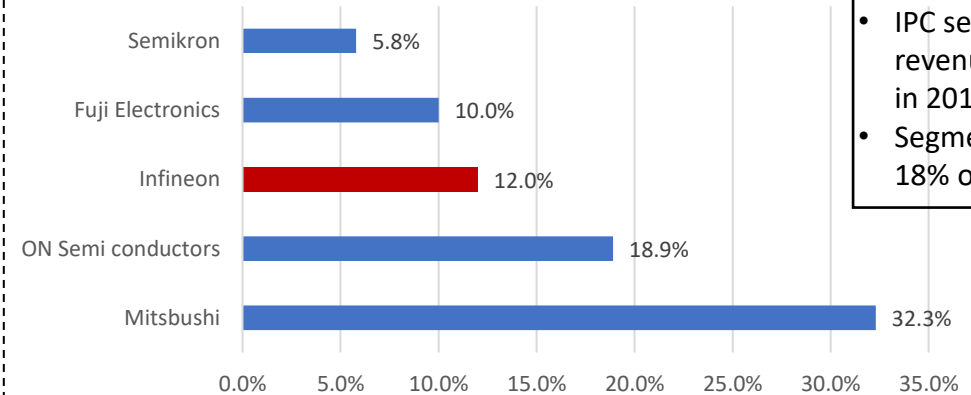
- Power management sector recorded revenue of 2445mn Euro in 2019
- Segment Contributed 30% of group revenue

### Smart Card and Security ICs

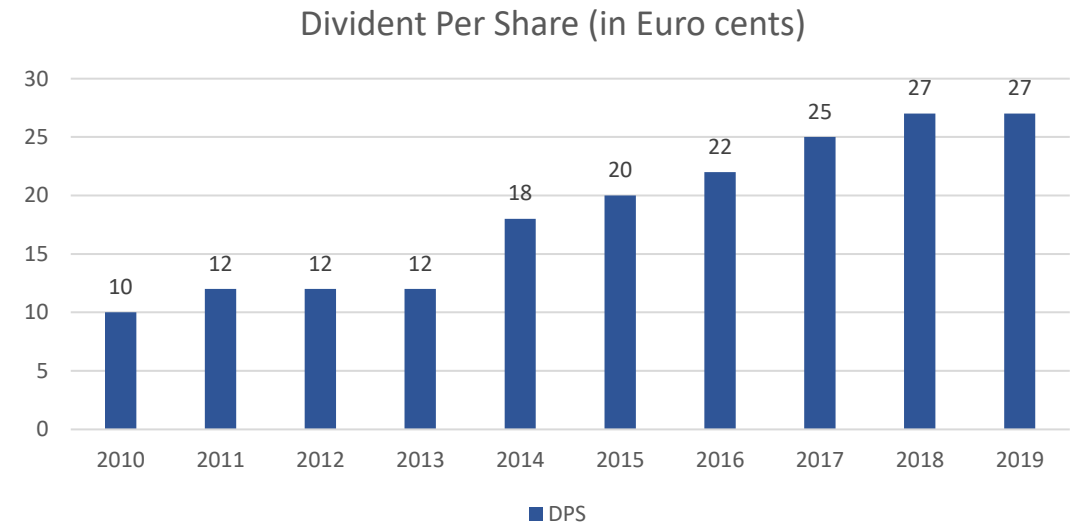
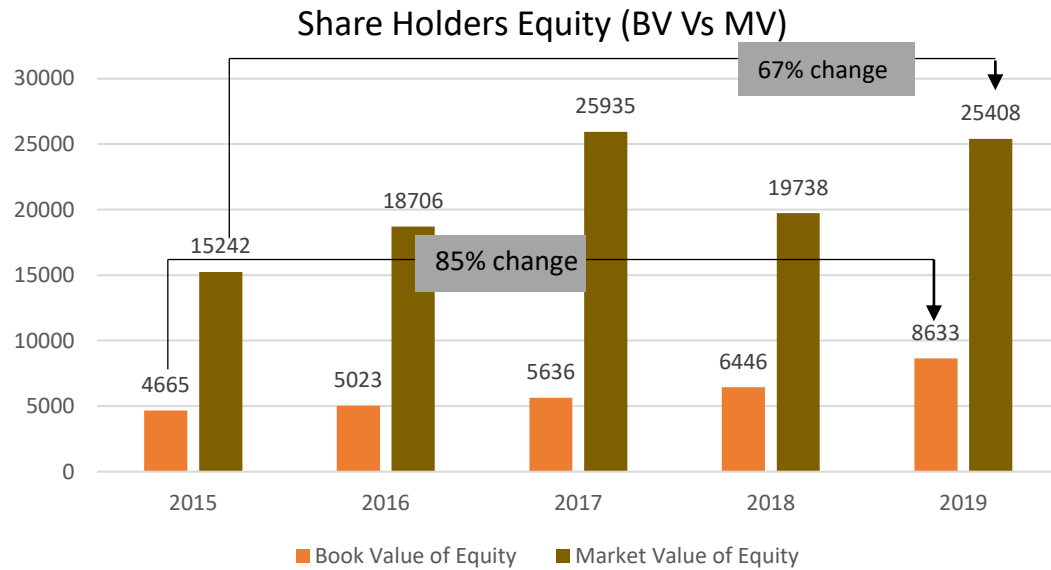


- DSS segment recorded revenue of 642mn Euro in 2019
- Segment Contributed 8% of group revenue

### IPC Market



- IPC segment recorded revenue of 1418mn Euro in 2019
- Segment Contributed 18% of group revenue



	2015	2016	2017	2018	2019
Revenue	5795	6473	7063	7599	8029
Gross Profit	2080	2330	2621	2885	2994
Gross Profit margin	35.9%	36.0%	37.1%	38.0%	37.3%
Net Income	634	743	790	1075	870
Net Income Margin	10.9%	11.5%	11.2%	14.1%	10.8%
Goodwill & other intangible assets	1738	1656	1586	1596	1805
ROE	13.60%	14.80%	14%	16.70%	10.10%
ROCE	12.20%	20.50%	14.9%	15.00%	12.80%
Share holders equity	4665	5023	5636	6446	8633
Market capitalization in mn euros	11294	17892	24039	22134	20552
Infineon Employees(as of 30 Sep)	35425	36299	37479	40098	41418

Revenue shows a positive growth time to time and their major contributor to revenue is Automotive sector

Goodwill increase is basically because of the acquisitions made by Infineon:

- 2019 - Cypress Semi Conductor
- 2018 - Siltegra GmbH
- 2018 – Merus Aps
- 2015 – International Rectifier



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	HISTORICAL FIGURES					PRESENT
Period End Date	30-Sep-2015	30-Sep-16	30-Sep-17	30-Sep-18	30-Sep-19	30-09-2020E
<b>Revenue</b>	<b>5,795.0</b>	<b>6,473.0</b>	<b>7,063.0</b>	<b>7,599.0</b>	<b>8,029.0</b>	<b>8256</b>
YoY % change in Revenue	34.14%	11.70%	9.11%	7.59%	5.66%	2.82%
Cost of Goods Sold	3,715.0	4,143.0	4,442.0	4,714.0	5,035.0	5,081.3
% of Revenue	64.11%	64.00%	62.89%	62.03%	62.71%	61.55%
<b>Gross Profit</b>	<b>2,080.0</b>	<b>2,330.0</b>	<b>2,621.0</b>	<b>2,885.0</b>	<b>2,994.0</b>	<b>3,174.2</b>
% change in GP	26.29%	12.02%	12.49%	10.07%	3.78%	6.02%
GP Margin	35.89%	36.00%	37.11%	37.97%	37.29%	38.45%
R & D Expenses	-717	-770	-776	-836	-945	-931
% of Revenue	-12.37%	-11.90%	-10.99%	-11.00%	-11.77%	-11.28%
Selling, G & A Expenses	-778	-791	-819	-850	-865	-945
% of Revenue	-13.43%	-12.22%	-11.60%	-11.19%	-10.77%	-11.44%
Other Operating income & expenses, net	-30	-6	-43	270	-23	-18
<b>EBIT=OP</b>	<b>555.0</b>	<b>763.0</b>	<b>983.0</b>	<b>1,469.0</b>	<b>1,161.0</b>	<b>1,280.3</b>
Tax	102	36	-142	-193	-194	-192
YoY Tax %	18%	5%	-14%	-13%	-17%	-15%
<b>NOPAT</b>	<b>657.0</b>	<b>799.0</b>	<b>841.0</b>	<b>1,276.0</b>	<b>967.0</b>	<b>1,088.2</b>
Current Tax Expenses	-151	-116	-125	-211	-135	
Deffered Tax Benefits	253	152	-17	18	-59	
<b>Income Tax</b>	<b>102</b>	<b>36</b>	<b>-142</b>	<b>-193</b>	<b>-194</b>	

- Revenue shows a positive growth during the period (2015 – 2019)
- Year on Year change in revenue shows a declining trend especially in the last two years(2018 & 2019)

- Decline in YoY change in revenue is basically because:
  - of declining trend shown in the segment results(especially Automotive Sector)
  - Economic downturn in 2019 fiscal year because of the prevailing geo political environment & trade conflicts.

- Impact of Corona pandemic can be clearly seen. Outlook for the year 2020 was not published by Infineon, shows the unpredictability of this year.
- “The effects of corona pandemic is unprecedented and the semi conductor industry is significantly feeling the impact” – said Dr Reinhard Ploss(CEO)



Automotive						
Q2 FY 19	Q4 FY 19	Q1 FY 20	Q2 FY 20	Q3 FY 2020(E)	Q4 FY 2020(E)	FY 2020
875	893	829	846	883	922	3480
	1%	-7%	2%	4%	4%	
Industrial Power Control						
Q2 FY 19	Q4 FY 19	Q1 FY 20	Q2 FY 20	Q3 FY 2020(E)	Q4 FY 2020(E)	
347	362	334	358	388	421	1501
	1%	-8%	7%	8%	8%	
Power and Sensor System						
Q2 FY 19	Q4 FY 19	Q1 FY 20	Q2 FY 20	Q3 FY 2020(E)	Q4 FY 2020(E)	
591	639	593	617	650	685	2546
	7%	-7%	4%	5%	5%	
Digital Security Solution						
Q2 FY 19	Q4 FY 19	Q1 FY 20	Q2 FY 20	Q3 FY 2020(E)	Q4 FY 2020(E)	
164	162	158	162	171	180	671
	-3%	-2%	3%	5%	5%	
Other Operating Segment						
						58
						8256

- First quarter of FY 2020 was negatively impacted by the pandemic.
- Second quarter shows a slight recovery and it can be clearly seen in the four segments.

- Quarter three and four is expected to have a positive recovery from the pandemic

# REVENUE BY SEGMENT



## Historical Analysis & Forecast



	2015	2016	2017	2018	2019	2020E	2021E	2022E	2023E	2024E
<b>Revenue by Segment</b>										
Automotive	2350	2656	2989	3284	3503	3480	4063	4773	5644	6718
% of Revenue	41%	41%	42%	43%	44%	42%	44%	46%	48%	50%
YoY change in %	20%	13%	13%	10%	7%	-1%	16.74%	17.47%	18.24%	19.05%
Industrial Power Control	971	1072	1206	1323	1418	1501	1650	1825	2031	2275
% of Revenue	17%	17%	17%	17%	18%	18%	20%	18%	17%	17%
YoY change in %	24%	10%	13%	10%	7%	6%	9.95%	10.59%	11.28%	12.01%
Power Management and Multi Market	1796	2041	2148	2318	2445	2546	2731	2939	3179	3458
% of Revenue	31%	32%	30%	31%	30%	31%	30%	28%	27%	26%
YoY change in %	69%	14%	5%	8%	5%	4%	7.28%	7.61%	8.16%	8.78%
Digital Security Solution	665	703	708	664	642	671	713	760	813	874
% of Revenue	11%	11%	10%	9%	8%	8%	8%	7%	7%	6%
YoY change in %	35%	6%	1%	-6%	-3%		6.30%	6.61%	7.02%	7.49%
Other Operating Segment	14	8	9	10	21	58	80	98	125	173
YoY change in %	-36%	-43%	13%	11%	110%	176%	38%	22%	28%	38%
Corporate and Eliminations	-1	-1	3	0	0					
<b>Revenue</b>	<b>5795</b>	<b>6479</b>	<b>7063</b>	<b>7599</b>	<b>8029</b>	<b>8256</b>	<b>9237</b>	<b>10394</b>	<b>11792</b>	<b>13498</b>

Yearly growth(Average)

Automotive 12.34%

Industrial Power Control 9.95%

Power Management and Multi Market 7.28%

Digital Security Solution 6.30%

Automotive sector is the major contributor to the revenue of Infineon technologies, followed by power management



- Despite the challenging situation Infineon successfully completed acquisition of Cypress Semi conductor (USA based) in April 2020.
- The acquisition is expected to be accretive to earnings in the 2021 financial year.(Integration of financials in 2021)

- The profitability is expected to rise while capital intensity of the combined business will decrease, increasing free cash flow.
- Infineon expect annual cost synergies of €180 million.

Will reflect in the financials of Infineon technologies

Exchange Rate(Avg) USD to Euro	
2015	0.9189
2016	0.9464
2017	0.8326
2018	0.8731
2019	0.9189

CYPRESS(in thousands Euro )	2017	2018	2019	2020	2021	2022	2023	2024
<b>Revenue</b>	<b>19,38,102</b>	<b>21,68,641</b>	<b>20,26,463</b>	<b>2188580</b>	<b>2377673</b>	<b>2593376</b>	<b>2840411</b>	<b>3124505</b>
(in mn)	1938	2351	2026	2186	2378	2593	2840	3125
Cost of Goods Sold	12,87,064	13,55,387	12,63,753	1395368	1515928	1653453	1810955	1992084
<b>Gross Profit</b>	<b>6,51,038</b>	<b>8,13,253</b>	<b>7,62,710</b>	<b>7,93,212</b>	<b>8,61,745</b>	<b>9,39,923</b>	<b>10,29,456</b>	<b>11,32,421</b>
R & D Expenses	3,02,176	3,17,805	3,33,300	340640	370071	403644	442094	486311
Selling, G & A Expenses	2,83,842	3,81,429	3,16,144	348965	379116	413509	452899	498197
<b>EBIT=OP</b>	<b>65,020</b>	<b>1,14,020</b>	<b>1,13,266</b>	<b>1,03,606</b>	<b>1,12,558</b>	<b>1,22,769</b>	<b>1,34,464</b>	<b>1,47,913</b>



Effect of acquisition of  
'International Rectifier'

HISTORICAL FIGURES

PRESENT

Effect of acquisition  
of 'Cypress'

FORECAST

Includes the forecasted revenue  
of Infineon and Cypress

Period End Date	30-Sep-2015	30-Sep-16	30-Sep-17	30-Sep-18	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E	CAGR(2015-2019)	CAGR(2020-2024)	Trend(2015-2019)
Revenue	5,795.0	6,473.0	7,063.0	7,599.0	8,029.0	8256	11423	12987	14632	16623	8.49%	19.12%	
YoY % change in Revenue	34.14%	11.70%	9.11%	7.59%	5.66%	2.82%	38.37%	13.69%	12.66%	13.61%			
Cost of Goods Sold	3,715.0	4,143.0	4,442.0	4,714.0	5,035.0	5,081.3	7,144.7	7,993.8	8,969.2	10,231.6	7.90%	19.12%	
% of Revenue	64.11%	64.00%	62.89%	62.03%	62.71%	61.55%	61.35%	61.55%	61.30%	61.55%			
Gross Profit	2,080.0	2,330.0	2,621.0	2,885.0	2,994.0	3,174.2	4,278.5	4,993.7	5,662.5	6,391.6	9.53%	19.12%	
% change in GP	26.29%	12.02%	12.49%	10.07%	3.78%	6.02%	34.79%	16.71%	13.39%	12.88%			
GP Margin	35.89%	36.00%	37.11%	37.97%	37.29%	38.45%	37.45%	38.45%	38.70%	38.45%			
R & D Expenses	-717	-770	-776	-836	-945	-931	-1320	-1500	-1699	-1939	7.15%	20.13%	
% of Revenue	-12.37%	-11.90%	-10.99%	-11.00%	-11.77%	-11.28%	-11.55%	-11.55%	-11.61%	-11.67%			
Selling, G & A Expenses	-778	-791	-819	-850	-865	-945	-1287	-1441	-1599	-1789	2.69%	17.30%	
% of Revenue	-13.43%	-12.22%	-11.60%	-11.19%	-10.77%	-11.44%	-11.27%	-11.10%	-10.93%	-10.76%			
Other Operating income & expenses, net	-30	-6	-43	270	-23	-18	-14	-30	-23	-18			
EBIT=OP	555.0	763.0	983.0	1,469.0	1,161.0	1,280.3	1,657.7	2,022.3	2,341.6	2,645.1	20.26%	19.89%	
Tax	102	36	-142	-193	-194	-192	-249	-303	-351	-397			
YoY Tax %	18%	5%	-14%	-13%	-17%	-15%	-15%	-15%	-15%	-15%			
NOPAT	657.0	799.0	841.0	1,276.0	967.0	1,088.2	1,409.0	1,718.9	1,990.3	2,248.3	10.15%	19.89%	

NOPAT = Operating Profit(1 – Tax rate)





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## Firm Valuation

The value of the firm is obtained by discounting expected cash flows to the firm, ie., the residual cashflows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted cost of capital, which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

Entity value = PV of FCFF in high growth period + PV of terminal value

$$\sum_{t=1}^{t=n} \frac{\text{FCFF}_t}{(1 + \text{WACC}_{\text{hg}})^t} + \frac{[\text{FCFF}_{n+1}/(\text{WACC}_{\text{sg}} - g_n)]}{(1 + \text{WACC}_{\text{hg}})^n}$$

$\text{FCFF}_t$	= free cash flow to firm in year t
$\text{FCFF}_{n+1}$	= free cash flow to firm in year n+1
$\text{WACC}_{\text{hg}}$	= weighted average cost of capital of high growth period
$\text{WACC}_{\text{sg}}$	= weighted average cost of capital of stable growth period
$g_n$	= constant growth rate

Source: <http://pages.stern.nyu.edu/~adamodar/pdfiles/eqnotes/dcfall2pgOld.pdf>

Damodaran, A. (2002): Investment Valuation, 2nd Edition, John Wiley & Sons, Inc., New York, P. 388.

Infineon Technologies  
Ajith Rajan

„A company only creates value in the long term if it generates a result that exceeds the cost of the capital employed.“

$$WACC = \left(\frac{E}{V}\right) * Re + \left(\frac{D}{V}\right) * Rd * (1 - t)$$

$$E(R) = R^f + \beta * (R^M - R^f)$$

WACC	Weighted cost of capital
Re	Cost of equity
Rd	Cost of debt
t	Tax rate
E	Equity value
D	Debt value
V	Total capital value

E(R)	Yield expectation
$\beta$	Beta factor
$R^f$	risk-free interest rate
$R^M$	Expected return market portfolio

## Determination of the cost of capital (equity and debt)

Source: <http://pages.stern.nyu.edu/~adamodar/pdfiles/eqnotes/dcfall2pgOld.pdf>  
<https://www.investopedia.com/terms/w/wacc.asp>



2019		WACC = 88.02% * 7.91% + 11.98% * 4.09*(1-15%) = <u>7,37%</u>	
% Share of Equity 88.02%		% Share of Debt 11.98%	
$E(R) = R^f + \beta * (R^M - R^f)$ $E(R) = 0.1\% + 1.1 * (7.1\% - 0.1\%)$ $E(R) = 7.91\%$		$R_d = \frac{\text{Interest expense}}{\text{Debt}}$ $R_d = \frac{141.6 \text{ Mio.€}}{3456 \text{ Mio.€}}$ $R_d = 4.09\%$	
$E(R)$ $\beta$ $R^f$ $R^M$	Yield expectation Beta factor risk-free interest rate Expected return market portfolio	$R_d = \text{Cost of Debt}$	

# Valuation - DCF Approach

## Calculation of WACC and Beta



WACC	7.37%
$\beta$	1.1
risk free rate	0.1%
market risk premium	7.1%
tax rate	15%
debt ratio	12%
equity ratio	88%

Cost of Equity	7.91%
Cost of Debt	4.09%

	Infineon	TEC DAX
Standard deviation	0.021475526	0.011576029
Covariance	0.000151887	
Variance	0.000134004	
Beta	1.13	

Beta was calculated based on 250 trading days share performance of Infineon and TEC DAX

Debt	3456
Equity	
Shares Outstanding(in mn)	1251
Share Price	20.31
Share Price*Shares O/S	25407.81
Total (Debt+Equity)	28863.81

Long Term Debt	Off Balance sheet Debt
1556	1900

=

+



## Free Cash Flow (FCF)

Operating Income

- Operating Expenses

= Income from Operations

- Tax

(= NOPAT) ✓

+ Depreciation

- Capex

- +/- Changes in provisions

+/- Changes In Working Capital

= Free Cash Flow

Net Value

Next steps

## Discounted Cash Flow (DCF)

$$EV = \frac{FCF_1}{(1+WACC)^1} + \frac{FCF_2}{(1+WACC)^2} + \dots + \frac{FCF_n}{(1+WACC)^n} + \frac{FCF_{n+1}}{WACC - g} \times \frac{1}{(1+WACC)^n}$$

Calculation of Terminal value  
and discounting it

Enterprise value = sum of discounted projected FCF.



# Valuation - DCF Approach

## Capex Calculation



	2015	2016	2017	2018	2019	2020	2021	2022	2023
Property Plant & Equipment(Beginning)	8799	9712	10237	11206	12038	12881	14046	15358	16720
<b>Additions</b>	<b>1025</b>	<b>716</b>	<b>1240</b>	<b>1090</b>	<b>1276</b>	<b>1378</b>	<b>1488</b>	<b>1607</b>	<b>1736</b>
Disposals	-169	-171	-215	-256	-191	-195	-199	-203	-207
Forex Effect	57	-20	-56	-2	25	-18	22	-42	28
Sum	9712	10237	11206	12038	13148	14046	15358	16720	18277
Depreciation & Imparement	-7619	-8118	-8547	-9000	-9638	-10666	-11631	-12717	-13846
<b>Property Plant &amp; Equipment(End)</b>	<b>2093</b>	<b>2119</b>	<b>2659</b>	<b>3038</b>	<b>3510</b>	<b>3600</b>	<b>3726</b>	<b>4003</b>	<b>4432</b>
<b>Capex</b>						<b>1636</b>	<b>1812</b>	<b>2119</b>	<b>2435</b>

$$\text{CapEx} = \text{PP\&E (current period)} - \text{PP\&E (prior period)} + \text{Depreciation (current period)}$$

# Valuation - DCF Approach

## Calculation of Net Working Capital

Net Operating Working Capital = Operating Current Asset – Operating Current liability														
	2015	% of Sales	2016	% of Sales	2017	% of Sales	2018	% of Sales	2019	% of Sales	2020E	2021E	2022E	2023E
Current Assets (€ Millions):														
Cash and cash equivalents	673	12%	625	10%	860	12%	732	10%	1,021	13%	1135	1275	1449	1633
Trade Receivables	742	13%	774	12%	851	12%	980	13%	895	11%	1005	1390	1581	1781
Inventories	1,129	19%	1,191	18%	300	4%	1,480	19%	1,701	21%	1367	1425	1530	1860
Total Current Assets	2,587		2,590		2,011		3,192		3,617		3507	4090	4560	5274
Current Liabilities (€ Millions):														
Trade payables	802	14%	857	13%	1,020	14%	1,181	16%	1,089	14%	862	1242	1458	1985
Total Current Liabilities	802		857		1,020		1,181		1,089		862	1242	1458	1985
Net Operating Working Capital	1,785		1,733		991		2,011		2,428		2645	2848	3102	3289
Delta Net Operating Working Capital			(52)		(742)		1,019		417		217	203	254	187

Operating Current Assets	Avg Change(Based on Revenue)
Cash and cash equivalents	11.16%
Gross Receivables	12.17%
Inventories	17%
Operating Current Liabilities	Avg Change(Based on Revenue)
Trade payables	14%
Other Current Liabilities	3.60%

Source: Infineon Annual Report(2015-2019)

	HISTORICAL FIGURES		FORECAST				
Period End Date	30-Sep-18	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
Revenue	7,599.0	8,029.0	8256	11423	12987	14632	16623
YoY % change in Revenue	7.59%	5.66%	2.82%	38.37%	13.69%	12.66%	13.61%
Cost of Goods Sold	4,714.0	5,035.0	5,081.3	7145	7994	8969	10232
% of Revenue	62.03%	62.71%	61.55%	61.35%	61.55%	61.30%	61.55%
Gross Profit	2,885.0	2,994.0	3,174.2	4,278.5	4,993.7	5,662.5	6,391.6
% change in GP	10.07%	3.78%	6.02%	34.79%	16.71%	13.39%	12.88%
GP Margin	37.97%	37.29%	38.45%	37.45%	38.45%	38.70%	38.45%
R & D Expenses	-836	-945	-931	-1320	-1500	-1699	-1939
% of Revenue	-11.00%	-11.77%	-11.28%	-11.55%	-11.55%	-11.61%	-11.67%
Selling, G & A Expenses	-850	-865	-945	-1287	-1441	-1599	-1789
% of Revenue	-11.19%	-10.77%	-11.44%	-11.27%	-11.10%	-10.93%	-10.76%
Other Operating income & expenses, net	270	-23	-18	-14	-30	-23	-18
EBIT=OP	1,469.0	1,161.0	1,280.3	1,657.7	2,022.3	2,341.6	2,645.1
Tax	-193	-194	-192	-249	-303	-351	-397
YoY Tax %	-13%	-17%	-15%	-15%	-15%	-15%	-15%
NOPAT	1,276.0	967.0	1,088.2	1,409.0	1,718.9	1,990.3	2,248.3
(+) Depreciation			1,546	1,686	1,843	2,006	
(-) Capex			1,636	1,812	2,119	2,435	
Delta NWC			217	203	254	187	
			1	2	3	4	5
Free Cash Flow			781.6	1,079.5	1,188.4	1,374.9	2,248.3
Discounted to t0			727.9	936.4	960.1	1,034.5	1,691.7
Enterprise value		26,613.2	27,793.0	28,761.8	29,693.1	30,506.6	30,506.6
Equity Value		23,419.6					

COGS is expected to reduce compared to 2018 & 2019 (Cost synergy effect of acquisition)

Infineon plans to keep R&D expense below 13% of revenue

Equity Value - 23419.6  
Shares O/s - 1251  
BVPS - 18.72 €

Equity value \* (1 – Debt ratio)

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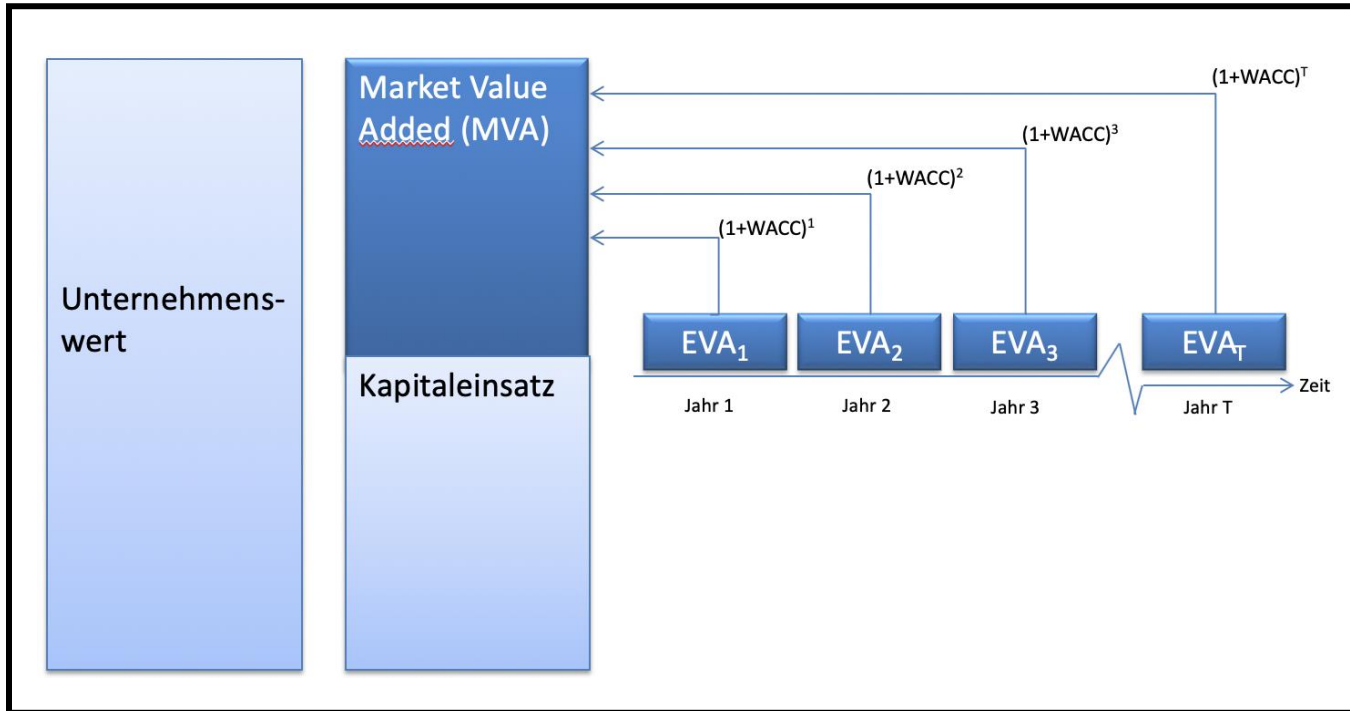
1. Book Value Method
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$$EVA = EBIT(1 - t) - WACC \times BIK_{t-1}$$

$$MVA = \sum \frac{EVA_t}{(1 + WACC)^t} = NKW$$

$$MVA_t = UGW_t - BIK_t$$

- EVA: Difference between operating profit and the cost of capital employed in a period (value contribution of a period)
- MVA: Sum of discounted EVA shows whether value has been created or destroyed
- Enterprise value is derived from MVA and capital invested



	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
BIC <sub>1</sub>	11178.00	12067.00	12373.67	12703.23	13233.73	13849.12
Depreciation	945	1,546	1,686	1,843	2,006	0
Capex	1417	1,636	1,812	2,119	2,435	0
Delta NWC	417	217	203	254	187	0
<b>BIC</b>	<b>12067</b>	<b>12374</b>	<b>12703</b>	<b>13234</b>	<b>13849</b>	<b>13849</b>

1. BIC = Book value of invested capital

$$\text{BIC}_t = \text{BIC}_{t-1} + \text{CAPEX} + \text{NWC} - \text{DEPRECIATION}$$

In the last year there is no Capex and Depreciation





	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
k*BIC		889	912	936	975	1021
EVA(RP)		199	497	783	1,015	1,228
MVA	14546.16	15419.30	16058.62	16459.42	16657.48	16657.48
BIK	12,067	12,374	12,703	13,234	13,849	13,849
<b>TEV</b>	<b>26613</b>	<b>27793</b>	<b>28762</b>	<b>29693</b>	<b>30507</b>	<b>30507</b>

$$TEV_0 = BIK_0 + \frac{RP_1}{1+k} + \frac{RP_2}{(1+k)^2} + \frac{RP_3}{(1+k)^3} + \dots + \frac{RP_t}{(1+k)^t} + \dots + \frac{RP_T}{(1+k)^T}$$

$$RP_t = OR_t \cdot (1-t) - k \cdot BIK_{t-1}$$



- Instead of considering the depreciation in the excess of capital expenditure, cost of capital of the residual income is taken into account.
- Cost of capital results from the product of the discount rate with the BIC at the beginning of the period. The latter increases with investments, delta NWC and reduces by depreciation.
- The TEV can also be obtained as the present value of residual income which is increased by the BIC.

$$MVA_t = TEV_t - BIC_t$$

	2019	2020	2021	2022	2023	2024
TEV	26613	27793	28762	29693	30507	30507
BIK	12067	12374	12703	13234	13849	13849
MVA	14546	15419	16059	16459	16657	16657

- MVA is a benchmark for the future total profits of the company.
- BIC is comprised out of equity and debt



	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
k*BIC		889	912	936	975	1021
EVA(RP)		199	497	783	1,015	1,228
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TEV	26613	27793	28762	29693	30507	30507

	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
K*BIC		2732	2754	2779	2818	2863
EVA(RP)		-1644	-1345	-1060	-828	-615
MVA	-10454	-9581	-8941	-8541	-8343	-8343
BIK	37067	37,374	37,703	38,234	38,849	38,849
TEV	26613	27793	28762	29693	30507	30507

## Scenario:

- BIC is increased by 25,000 (in €).
- Even with changed BIC, the enterprise value remains the same!

Determination of the company's value with the help of acquisition fiction:

- Acquisition fictitious the objective is to use the fictitious market values as basis, instead of book values.
- The objective of this assessment is to define which price is to be paid for the acquisition of the business at the time of analysis.
- The basis for this assessment could be data derived from capital market, such as revenue, earnings or cash multiples.
- Based on this assessment, the fictitious  $MVA_0$  related goodwill is determined.

	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
K*BIC		889	912	936	975	1021
K*MVA0		1072	1072	1072	1072	1072
EVA(RP)		-895.7	-575.0	-289.3	-57.1	155.6
BIC + MVA0	26613	27793	28762	29693	30507	30507
TEV	26613	27793	28762	29693	30507	30507

$$RP = NOPAT - k \cdot (BIC_{t-1} + MVA_0)$$

$$MVA_0 = \frac{RP_1}{1+k} + \frac{RP_2}{(1+k)^2} + \frac{RP_3}{(1+k)^3} + \dots + \frac{RP_t}{(1+k)^t} + \dots + \frac{RP_T}{(1+k)^T}$$

Market values represent the economically justified basis for shareholders' right to interest!  
Book values do not reflect the investors' options for action!



Period End Date	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967.0	1,088.2	1,409.0	1,718.9	1,990.3	2,248.3
(+) Depreciation		1,546	1,686	1,843	2,006	
(-) Capex		1,636	1,812	2,119	2,435	
Delta NWC		217	203	254	187	
		1	2	3	4	5
Free Cash Flow		781.6	1,079.5	1,188.4	1,374.9	2,248.3
Discounted to t0		727.9	936.4	960.1	1,034.5	1,691.7
<b>Enterprise value</b>	<b>26,613.2</b>	<b>27,793</b>	<b>28,762</b>	<b>29,693</b>	<b>30,507</b>	<b>30,507</b>
	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
K*BIC		889	912	936	975	1021
EVA(RP)		199	497	783	1,015	1,228
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	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
NOPAT	967	1088	1409	1719	1990	2248
K*BIC		889	912	936	975	1021
K*MVA0		1072	1072	1072	1072	1072
EVA(RP)		-895.7	-575.0	-289.3	-57.1	155.6
BIC + MVA0	26613	27793	28762	29693	30507	30507
TEV	26613	27793	28762	29693	30507	30507

The Enterprise value is the same for all procedures!



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### Static Approach

Static analysis of the MV-BV-PV-Gap is applied to a specific date

Specific date financial data is used for this approach

Shows Market – Book – Present value gap from three different perspectives namely, Capital market, Accounting & Present perspective

### Dynamic Approach

Multi period approach of the MV-BV-PV-Gap as values such as MV, BV & NI change over the course of time

Helps in analyzing the Present value and Future Potential changes over the course of time

Dynamic analysis works like a third eye that gives a glimpse where the company is approaching and based on that, if necessary management can make necessary plans for betterment.

Accounting perspective is based on financial statements. Capital Market perspective focuses on stocks or market value of private equity. The additional perspective acts as a bridge to the capital market perspective as there is a gap between Book value and Market value of the company



in m. \$

- Net Income (NI) = 870
- Book Value of Equity (BV) = 8633
- Revenue = 8029



Annual Statement 2019

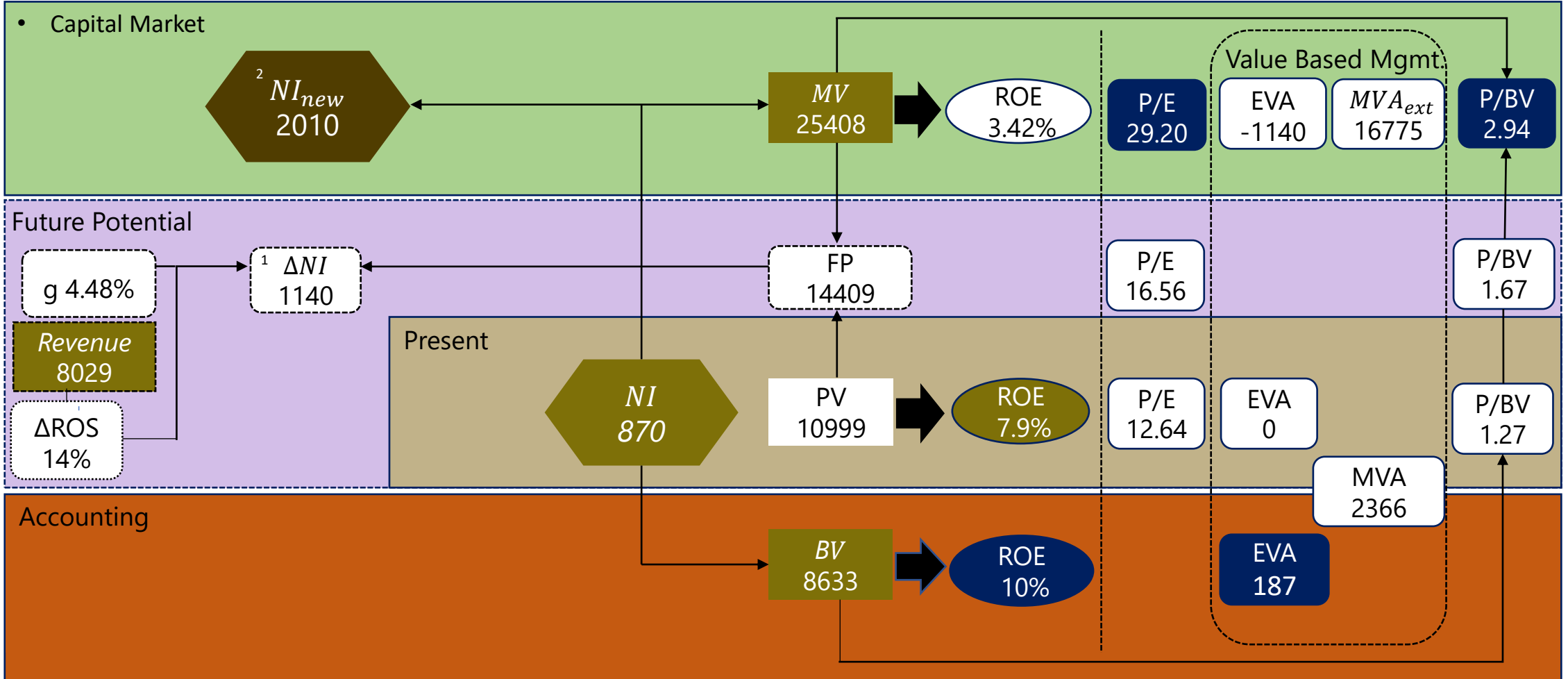
- Market Value of Equity (MV) = 25408
- Rate of Cost of Equity  $r_{EQ} = 7.91\%$

- NI implicitly expected by the Capital Markets =  $NI_{New}$ 
  - $NI_{New} = MV \times r_{EQ} \rightarrow 25408 \times 7.91\% = 2010$

Key input data for FY 2019 analysis of Infineon Technologies

in m. €  $r_E = 7.91\%$

- Capital Market



- Honold, Dirk, Fuelbier, Rolf; Weese Andrease (2017): Future Potentials from the Capital Market's Perspective –Market-Book-Present Value-Gap based on examples of DAX-Companies, p. 252

in m. €

$$NI = 870$$

$$NI_{New} = MV \times r_{EQ}$$

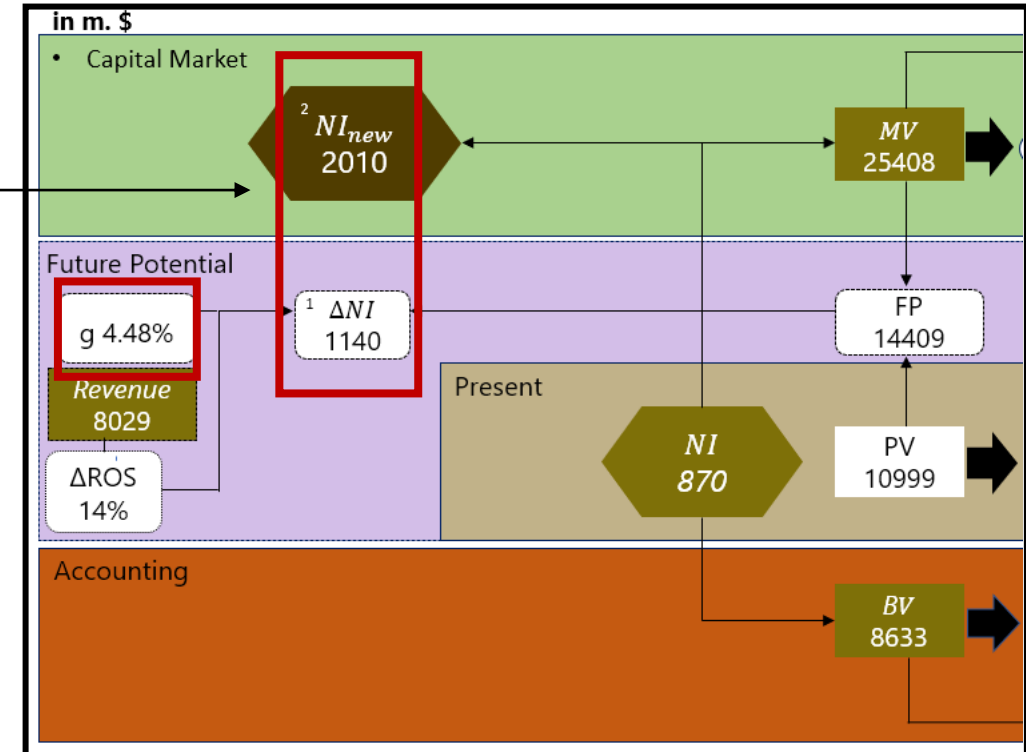
$$NI_{New} = 25408 \times 7.91\% = 2010^2$$

$$\Delta NI = NI_{New} - NI$$

$$\Delta NI = 2010 - 870 = 1140^1$$

$$g = \Delta NI / MV$$

$$g = 1140 / 25408 = 4.48\%$$



$NI_{New}$  shows the higher NI expectations to meet the Market Value view. Delta NI shows the income to be generated to meet the capital market perspective (to fulfil the future potential)

in m. €

*MV*  
• 25408



ROE  
3.42%

$$\frac{NI}{MV}$$

*PV*  
10999



ROE  
7.91%

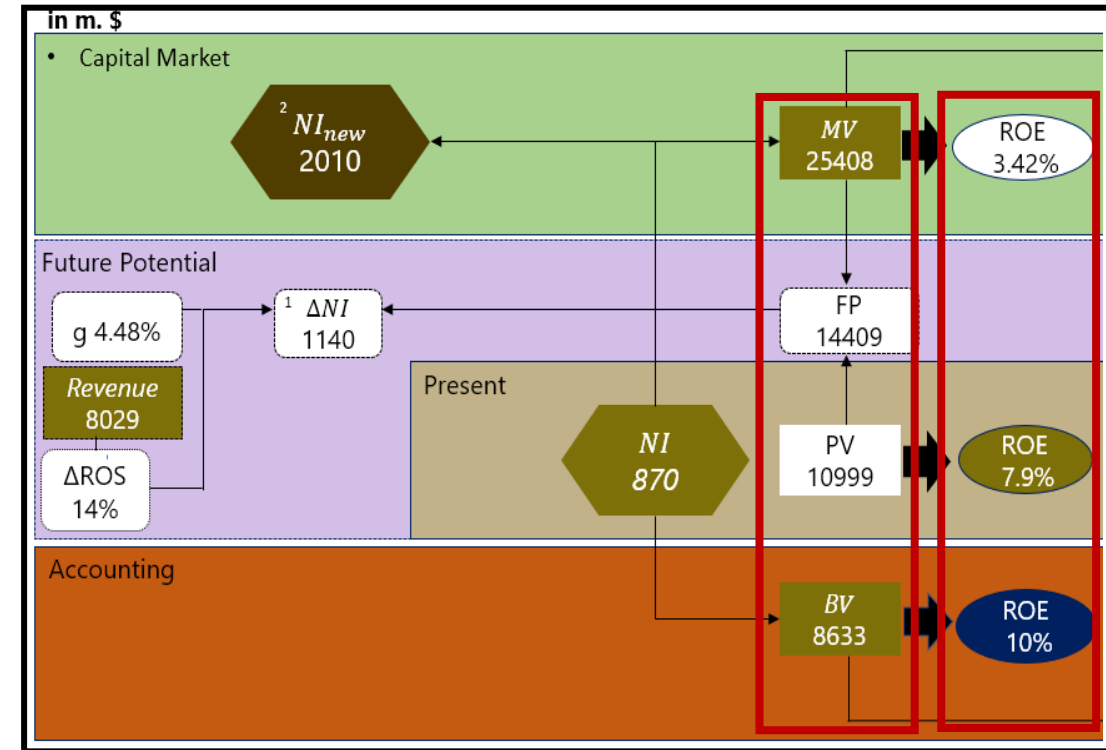
$$\frac{NI}{PV}$$

*BV*  
8633



ROE  
10.07%

$$\frac{NI}{BV}$$



$$FP = MV - PV$$

$$FP = 25408 - 10999 = 14409$$

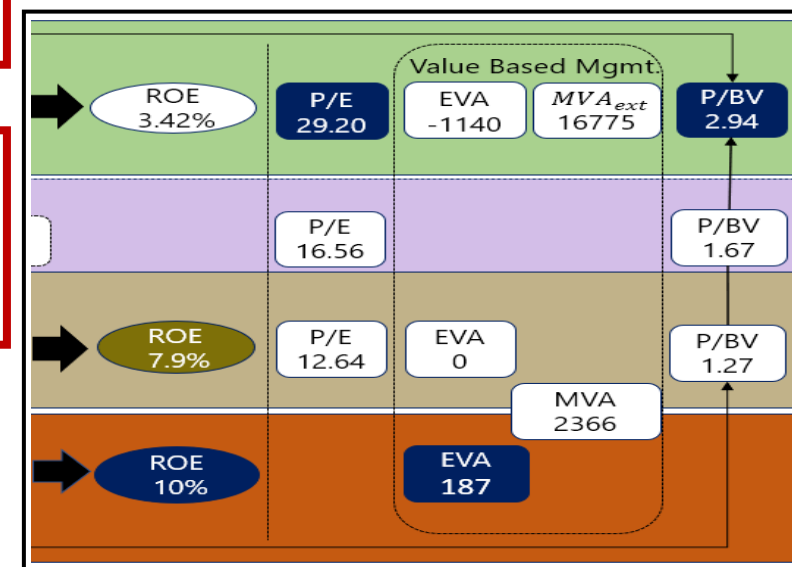
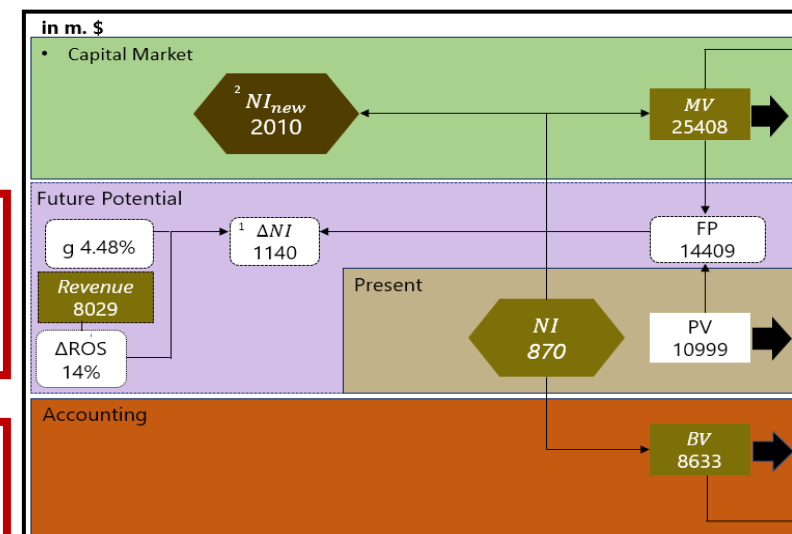
Capital Market and Present value gap shows the future potential. Infineon shows a positive future potential and the market expects the company to generate more profit in the future.



ROE on BV of 10% is not sufficient long term return from the perspective of owners, who focus on MV. From their perspective with MV as basis, the return is merely 3.42% ( $870/25408$ )

BV as a basis they expect a long term improvement to  $ROE_L$  of 23.2% ( $=2.94 \times 7.91\%$ ). Therefore, the owners expect a sustainable increase of future NI to a level of 2010€ in order to achieve their required risk adequate returns

This corresponds to a NI increase of 1,140€ against current levels, or alternatively, can also be explained by an increase of 14% over a revenue of 8029€, by an increase in Return On Sales (ROS) of 14%, or as a perpetual NI growth (g) of about 4.48%.



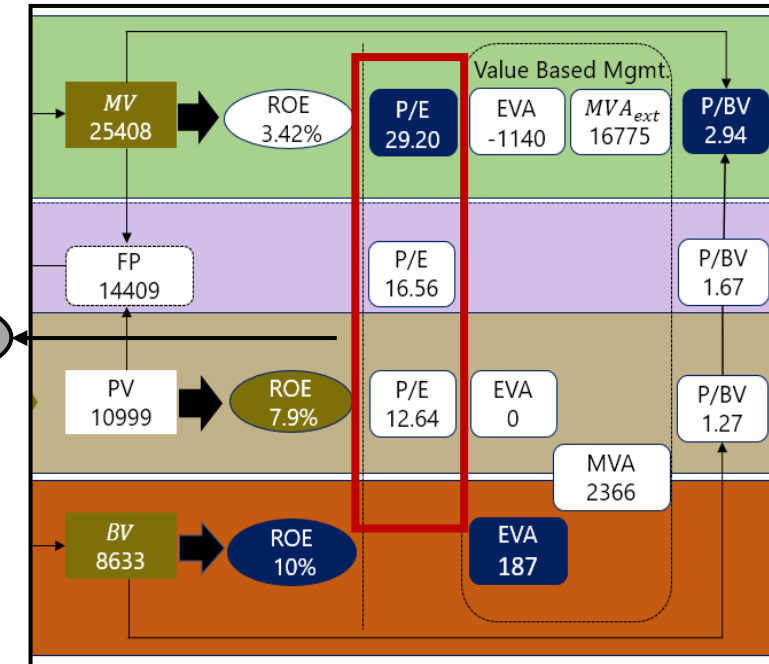
- Honold, Dirk, Fuelbier, Rolf; Weese, Andrease (2017): Future Potentials from the Capital Market's Perspective – Market-Book-Present Value-Gap based on examples of DAX-Companies,





- P/E can be interpreted as the reciprocal of both  $r_{EQ}$  and growth expectations  $\frac{1}{r_{EQ} - g}$
- Accounting Perspective therefore indicates a P/E:
  - $\frac{P}{E_{PV}} = \frac{1}{0.079}$
  - $\frac{P}{E_{PV}} = 12.64$
- P/E of the Market perspective can be calculated as  $\frac{1}{r_{EQ} - g}$ :
  - $\frac{P}{E_{MV}} = \frac{1}{0.079 - 0.0448}$
  - $\frac{P}{E_{MV}} = 29.2$

$\Delta P/E = 16.56$



The  $\Delta P/E = 16.56$  can be explained by expected positive FP



in m. €

$$P/BV = \frac{MV}{BV}$$

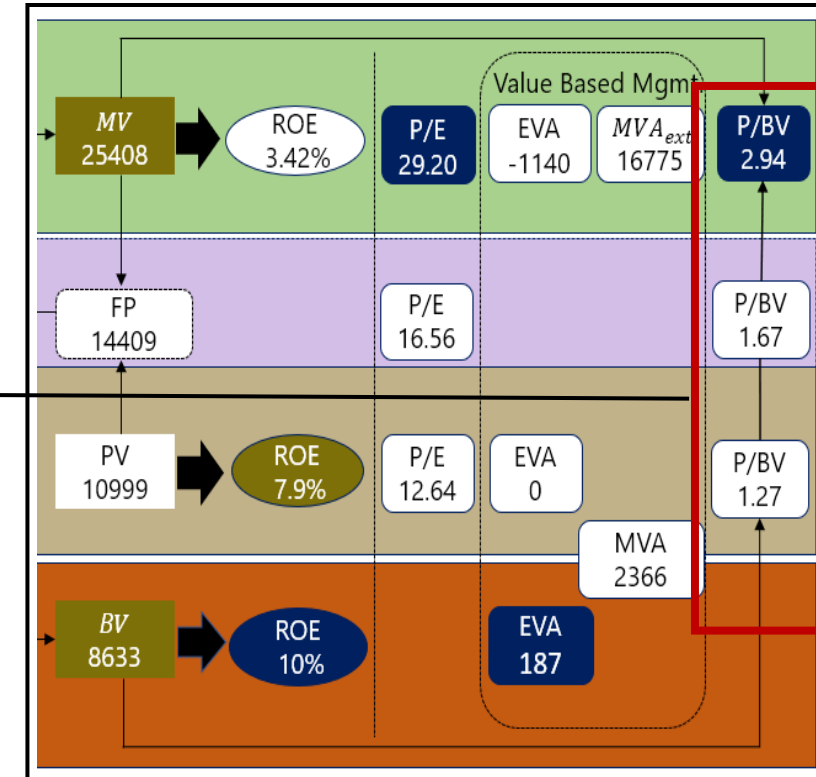
- $P/BV_{PV} = 10999/8633$

- $P/BV_{PV} = 1.27$

- $P/BV_{MV} = 25408/8633$

- $P/BV_{MV} = 2.94$

$$\Delta P/BV = 1.67$$



The  $\Delta P/BV = 1.67$  can be explained by expected positive FP



$$NI = 870$$

$$\frac{-682.87}{187.13}$$

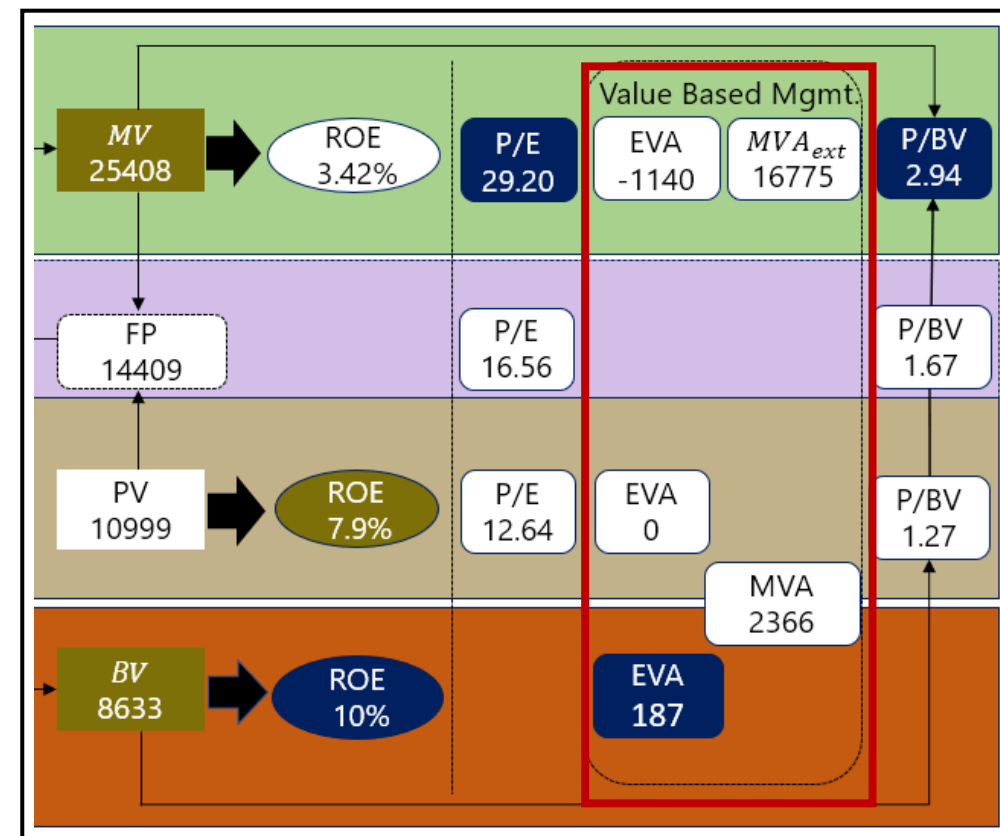
EVA Accounting Perspective

$$MVA = 187.13 / 7.91\% \\ = 2366$$

Gap between BV and PV closed  
 $8633 + 2366 = 10999$

$$EVA_{FP} = NI - NI_{NEW} \\ = 870 - 2010 = -1140$$

$$MVA_{ext} = MVA + FP \\ = 2366 + 14409 = 16775$$



MVA derived from the MV(MVA<sub>ext</sub>) results in a value of 16775, as a difference between the BV (8633) and the MV (40000). This can be calculated as the addition of MVA & FP (MVA<sub>ext</sub> = 2366 + 14409)

- Honold, Dirk, Fuelbier, Rolf; Weese, Andreas (2017): Future Potentials from the Capital Market's Perspective – Market-Book-Present Value-Gap based on examples of DAX-Companies,

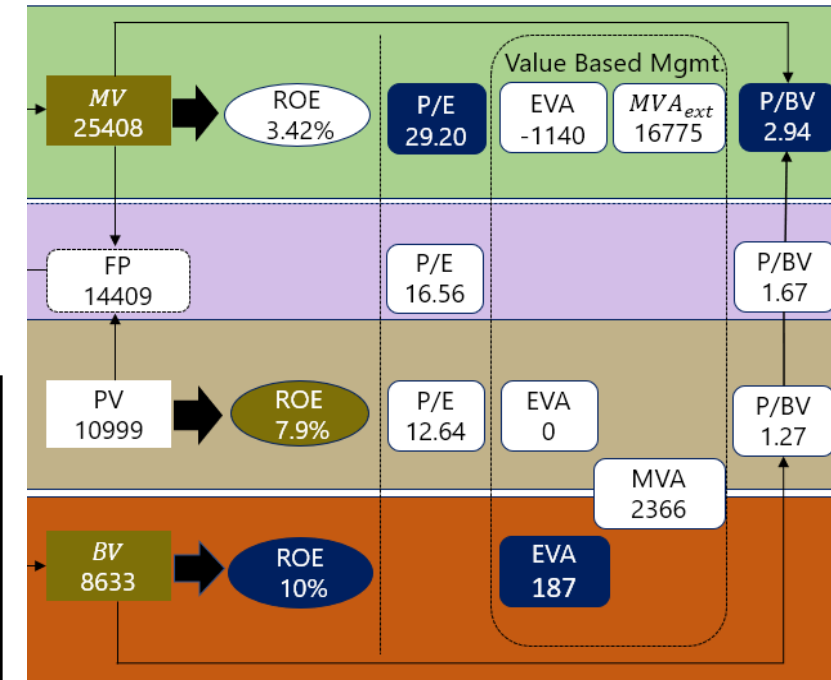


### Implementation of EVA using Equity Method

- After deduction cost of capital calculated on BV( $8633 \times 7.91\%$ ) an amount of 187 remains.
- Current level of profitability does not create value for the owners of the firm.

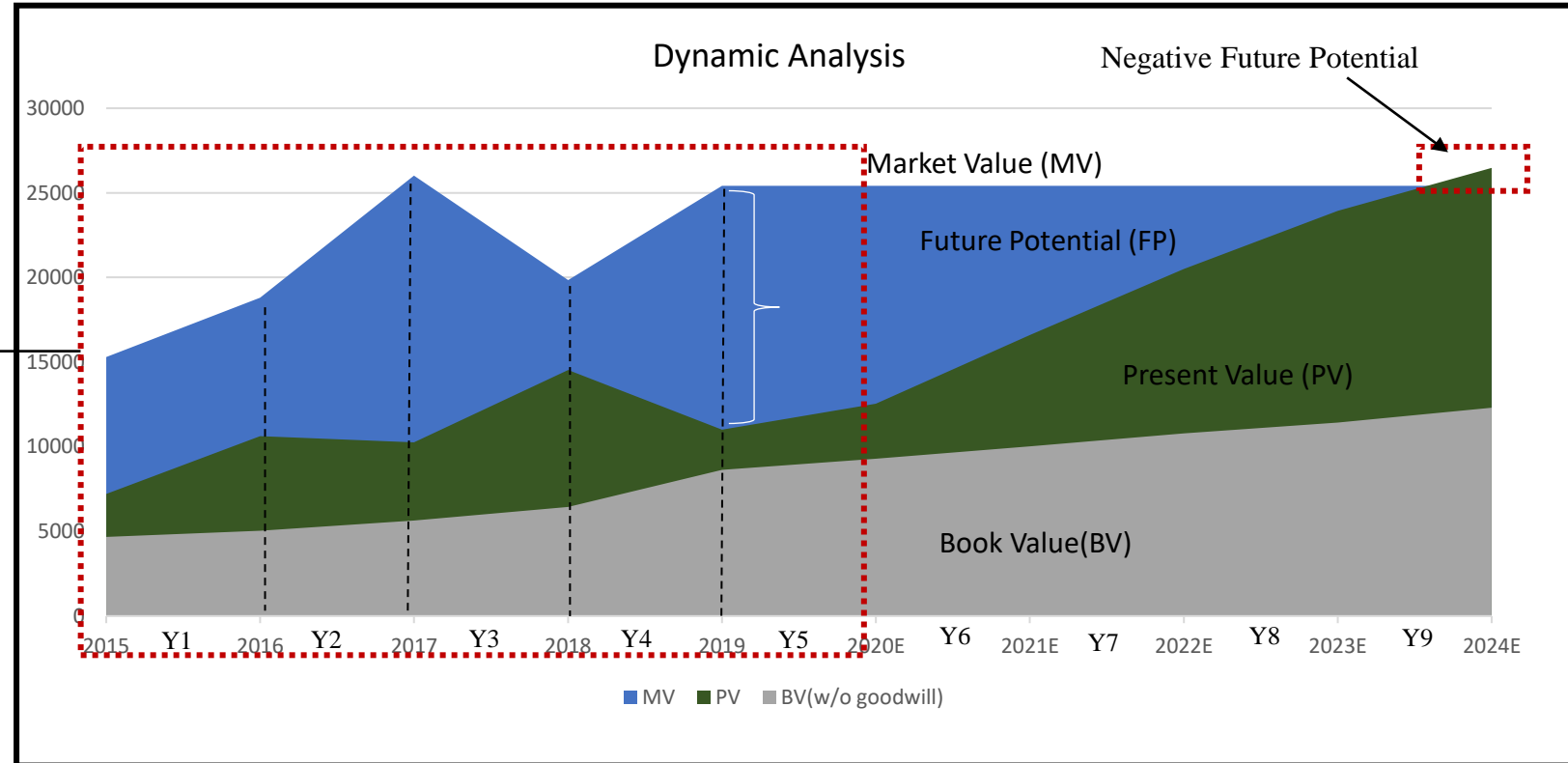
### Application Of Luke Theorem

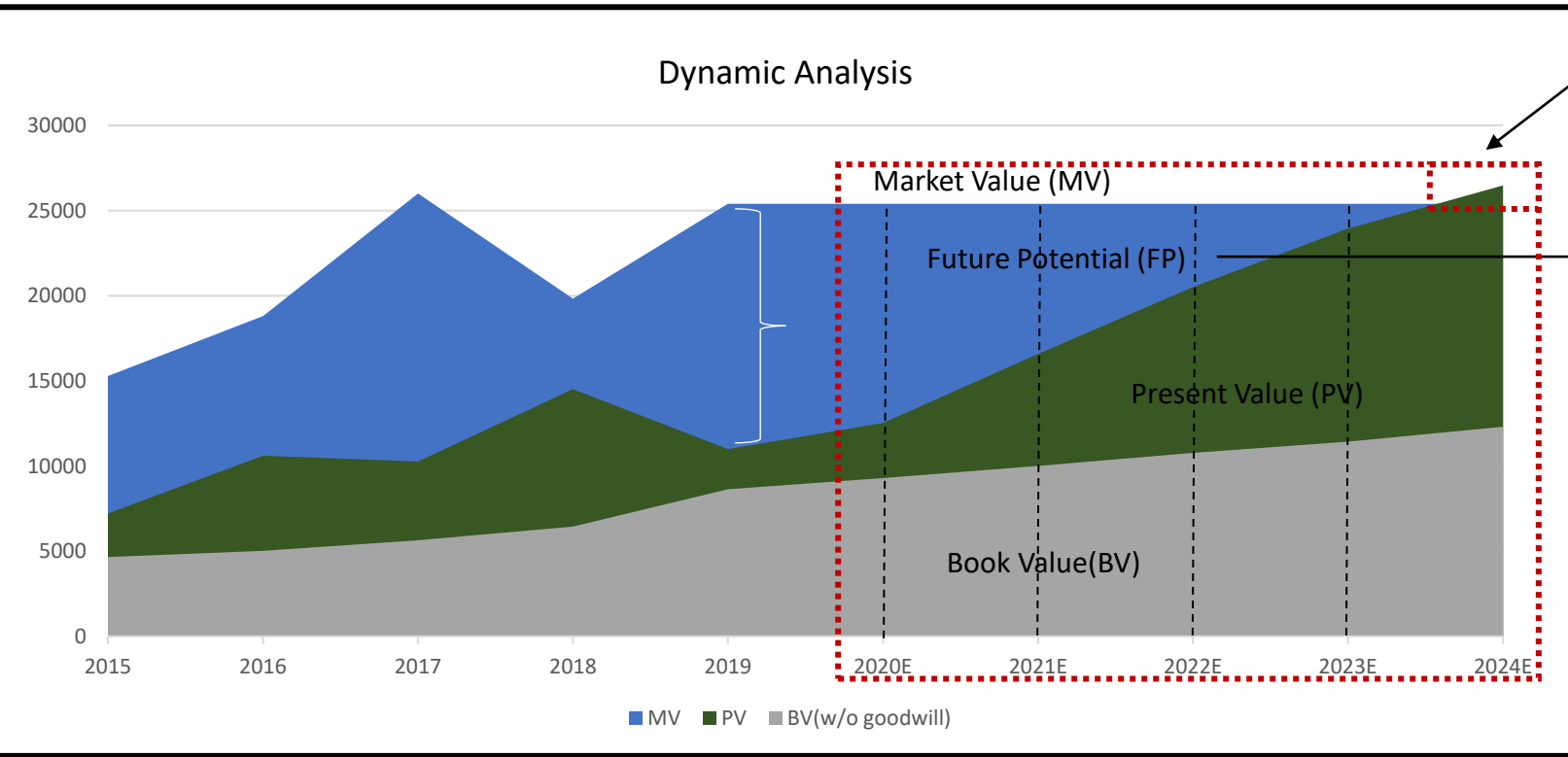
- The discounted EVAs to be added up to the Market value added of (2366).
- There by gap between BV and PV is closed ( $8633 + 2366 = 10999$ )
- This shows that FP is not included in the Book value based EVAs
- MVA derived from market value (MVA<sub>ext</sub>) results in a value of 16775, as a difference between BV(8633) and the MV(25408)
- $MVA_{ext} = MVA + FP = 2366 + 14409 = 16775$



To justify Market price the profits has to be improved and thereby it demands the owners and management to improve performance to achieve the required result

- Difference between the Market value and Present value shows the Future Potential (FP).
- Market value reflects the investors opinion about the company.
- In Y1 MV growth is followed by PV growth(increase in NI)
- In Y2 there is an increase in FP due to increase in MV, not accompanied by corresponding increment in PV which raises FP as a residual value.
- In Y3 the FP fell down because the MV went down and the NI went up, reducing the gap between both.
- In Y4 we can see just the opposite, ie the MV went up, PV fell down, which in turn increased FP.





Negative Future Potential

- In the case of Infineon we can clearly see that the Market value is above Present value, which shows positive Future potential for the company.
- With MV kept constant (from 2019) the PV of the company meets MV and fulfils the FP before 2024.
- Through strong profit improvement PV increase sharply than MV
- In the last year 2<sup>nd</sup> half we can see negative future potential as PV overtook MV.



Future Potential	30-Sep-19	30-09-2020E	30-09-2021E	30-09-2022E	30-09-2023E	30-09-2024E
PV	10999	12532	16587	20505	23936	26477
FP	14,409	12,876	8,821	4,903	1,472	(1,069)
MV	25,408	25,408	25,408	25,408	25,408	25,408
BV	8633	9296	10009	10777	11424	12300
MV/PV	2.31	2.03	1.53	1.24	1.06	0.96
MV/BV	2.94	2.73	2.54	2.36	2.22	2.07
NI	870	991	1,312	1,622	1,893	2,094
P/E	29.2	25.6	19.4	15.7	13.4	12.1
ROEBV	10%	11%	13%	15%	17%	17%
ROEL	23%	22%	20%	19%	18%	16%
ROEMV	3.42%	3.90%	5.16%	6.38%	7.45%	8.24%





- ✓ Irrespective of the challenging situation in the last two years(2018 & 2019) Infineon Technologies showed a positive growth and it's expected to continue
- ✓ Acquisitions done by Infineon Technologies is a driving force for its future growth
- ✓ Corona Pandemic has made valuation of Company a difficult task
- ✓ Through out the period (2015 – 2019) MV of the company is above PV which clearly shows the higher market expectation and Future Potential of Infineon Technologies
- ✓ Any changes in Cost of Equity and Net income can have significant influence on performance outcomes and FP of companies
- ✓ Next question that would arise is; Should an Investor invest or not invest in the company?
  - : Valuation and Future Potential analysis shows positive outlook for the company
  - : As an investor he/she also has to take into consideration the demand for the product of the company and current geopolitical environment.
  - : Keeping that in mind my view point is, Infineon is a company with good potential and can be considered for investment.

## Sources



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