Controlling in highly competitive high-tech industries

Dominik Asam, CFO
16 May 2017

Agenda

1. Characteristics of semiconductor industry
2. Introduction to Infineon
3. Controlling at Infineon
4. Lessons learned from implementation of R&D controlling
5. Forecasting in a capital-intensive and volatile business

More with less: semiconductors are vital building blocks in various crucial areas of life

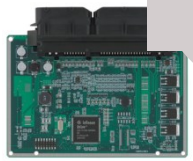
More **energy** with less **resources**

More **performance** with less **energy**

More **mobility** – safe and with less **CO_2**

More **security** at lower cost

The semiconductor industry has significant leverage on downstream innovation



x 20 - 100

×5

Automotive / Industrial / Medical / ...

WW: ~USD 30,000 bn

Electronics
WW: $1,600 bn

Semiconductors
WW: $298 bn

Innovation

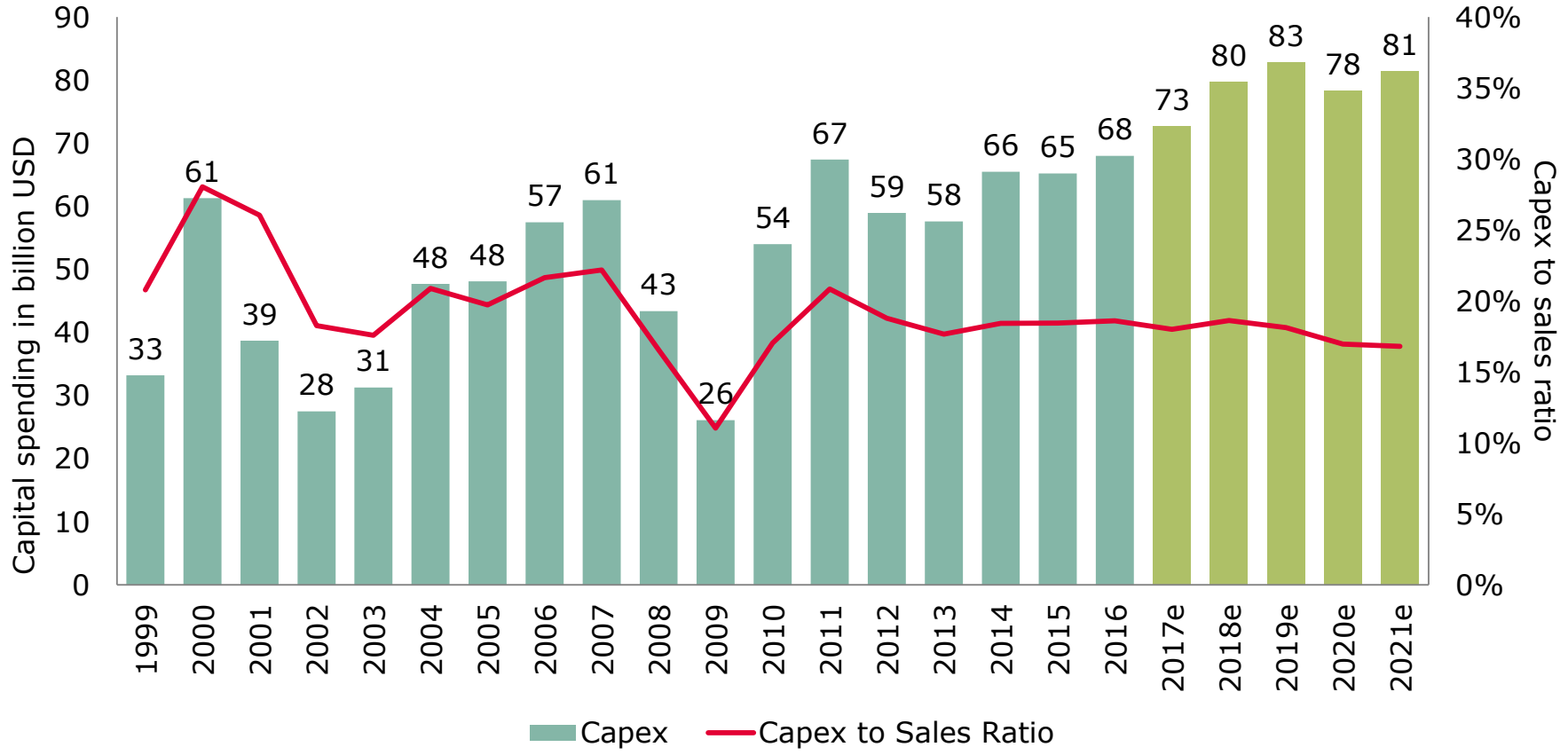
Productivity

- About 45% of the OECD Economic growth since 1985 comes from increased productivity; electronics is a key driver for this growth
- Up to 80% of innovation in automotive is enabled by semiconductors, even more when it comes to Hybrid and EV

Source: DECISION, ESIA, Future Horizons, IMF, WSTS 2010, AUDI, OECD Factbook 2013, Infineon

Capital intensity is slightly declining but very high compared to other industries

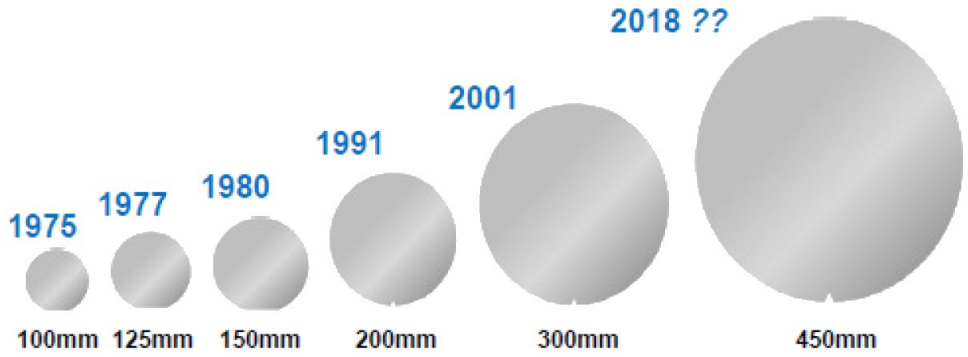
Worldwide Semiconductor Capital Spending

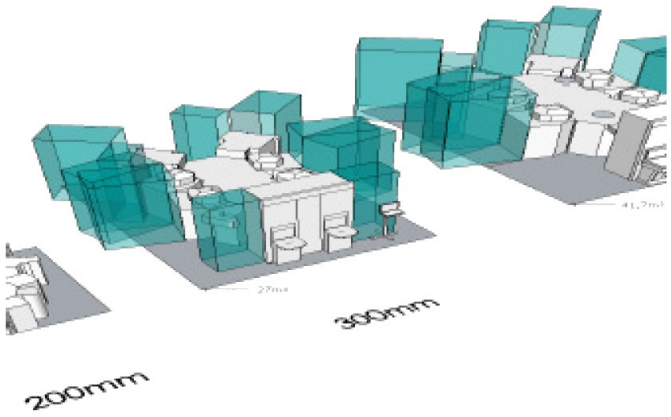


Calendar years.
Source: IC Insights, The McClean Report 2016, March 2016.

Wafer diameter is a key lever for cost reduction but also drives scale of factories

Larger wafer diameters





Wafer Transition	Area Increase
100mm → 125mm	56%
100mm → 150mm	125%
125mm → 150mm	44%
150mm → 200mm	78%
200mm → 300mm	125%
300mm → 450mm	125%

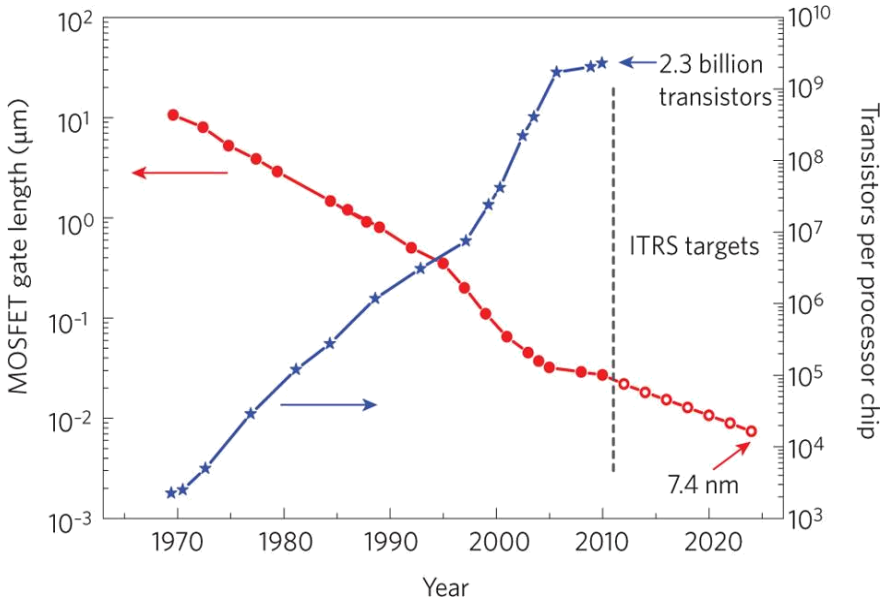
SEMI Industry Strategy Symposium (ISS) – January 15, 2013: Intel Corporation executives make first public presentation of 450mm silicon wafer patterned with 26nm features using nano imprint lithography.

Source: Intel, SEMI ISS 2013

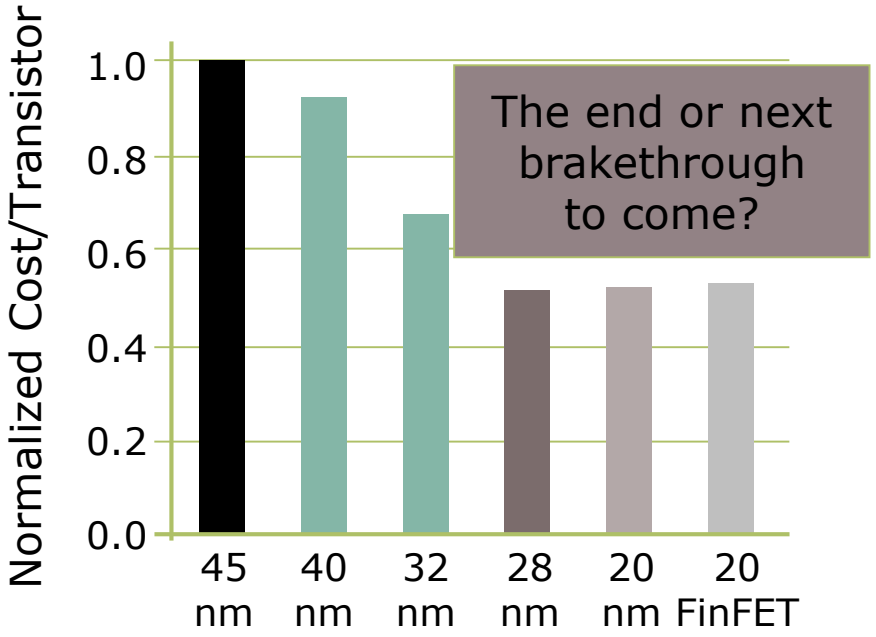
Shrink of feature size as another key lever for cost reduction hits economical limits

Moore's Law - scaling for more than 20 generations: often assumed to be at the end but survived - now stalling!?

Scaling of Gate Length



Cost per Transistor Scaling



No cost/transistor crossover for first time at 28 → 20nm transition expected. But system integration is still a driver.

Source: Lisa Su, AMD, ISSCC '13 Keynote

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Leadership in system understanding will foster future growth

Competitive advantages	Leading in system-crucial categories
System leader in Automotive	 Courtesy: BMW Group › Advanced Driver Assistance System (ADAS) - Infineon AURIX™ µC, the central processing unit responsible for all safety relevant decisions › Sensors – pressure, magnetic and radar sensors for safety and comfort features › CO_2 reduction – Infineon enables energy efficient and compact designs in all areas requiring electronics
#1 and technology leader in Power	
Leader in Security Solutions	

Leadership in system understanding will foster future growth

Competitive advantages

System leader in Automotive

#1 and technology leader in Power

Leader in Security Solutions

Broad product & technology portfolio

- System leader with digitalization of the control loop and functional integration
- 300mm thin-wafer manufacturing for power semiconductors
- Leader in next-generation power semiconductor materials
  GaN and SiC

Leadership in system understanding will foster future growth

Competitive advantages

System leader in Automotive

#1 and technology leader in Power

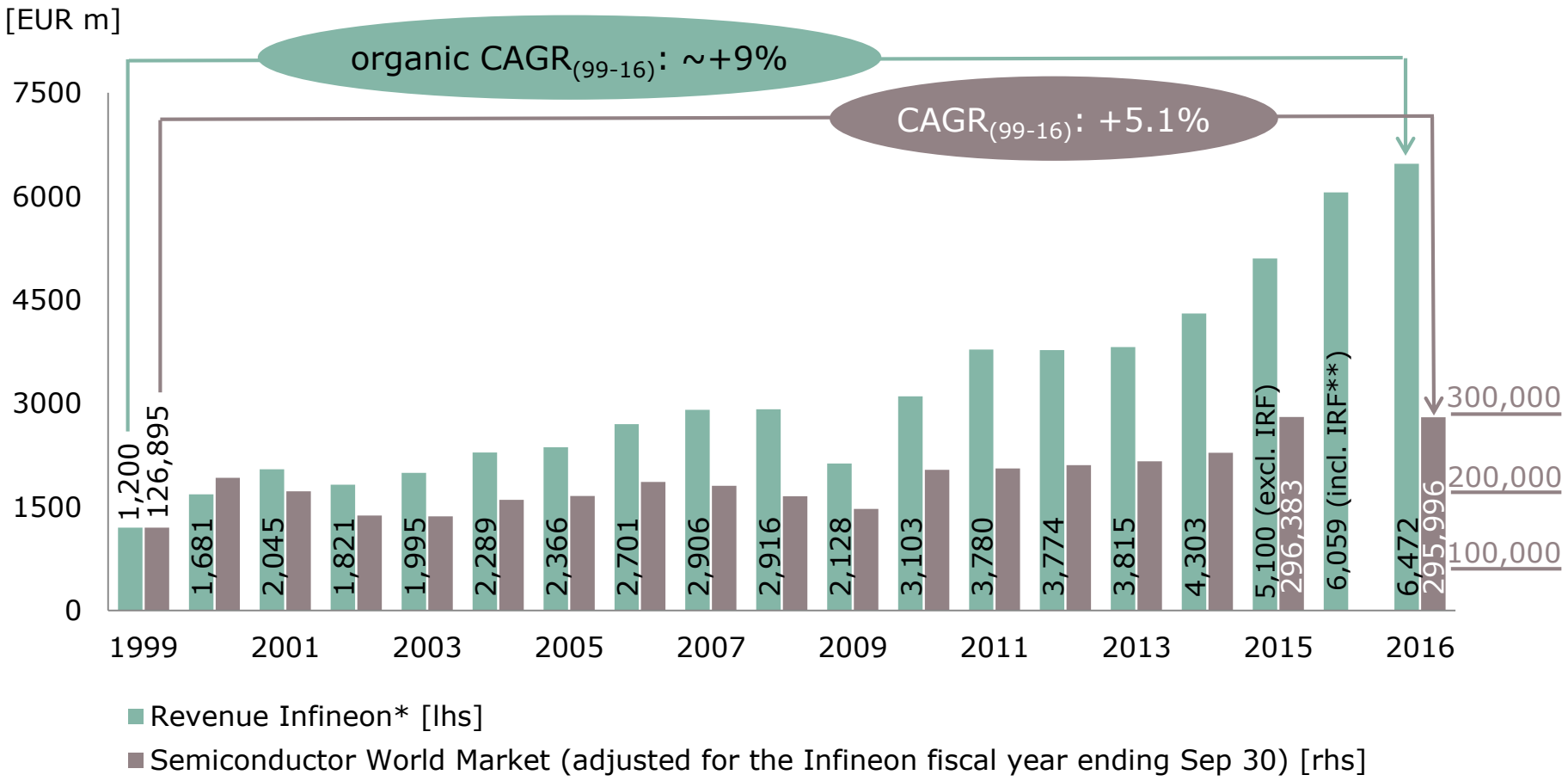
Leader in Security Solutions

Mobile Communication & IoT Security



- Hardware based security for
  - Compliance with security mechanisms determined on application level
  - Secure & trusted environment for data storage and code execution
  - Protection against manipulation, access and theft of secrets
- Machine-to-Machine communication as backbone for reliable operation

Infineon's revenue development (excl. IRF) outperformed total semi market



* Based on Infineon's portfolio (excl. Other Operating Segments and Corporate & Eliminations) per end of FY16.

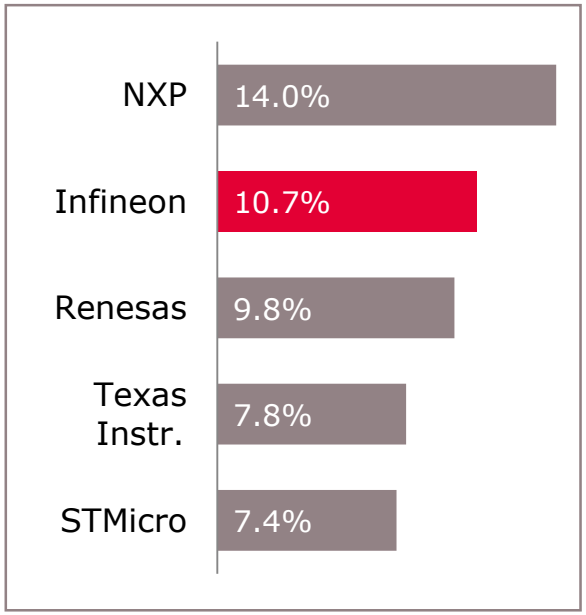
** If International Rectifier had been consolidated since 1 Oct 2014, Infineon would have recorded revenues of €6,059m in FY15.

Source: Infineon; WSTS (World Semiconductor Trade Statistics), November 2016

Infineon increased relative market share in power and outperformed chip card market

Automotive semiconductors

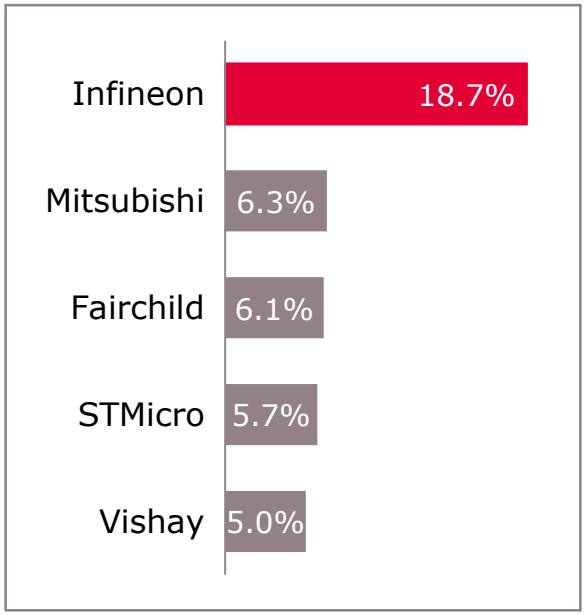
total market in 2016: $30.2bn



Source: Strategy Analytics, April 2017

Power discretes and modules

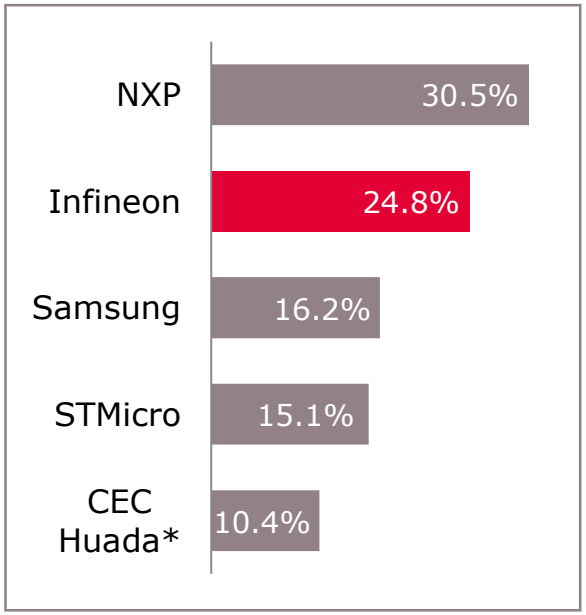
total market in 2015: $14.8bn



Source: IHS Markit, October 2016

Smart Card ICs

total market in 2015: $2.72bn



Source: IHS Markit, July 2016

* including SHHIC (in 2015, SHHIC was acquired by CEC Huada.)

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Main controlling KPIs at Infineon

Management Board

- Segment Result Margin
- Revenue growth
- FCF from continuing operations
- Return on capital employed

Divisions

- Segment Result Margin
- Revenue growth
- Gross Margin
- R&D-to-Sales

Operations

- CapEx-to-Sales
- Gross Margin

Central Functions

- G&A-to-Sales
- S&M-to-Sales

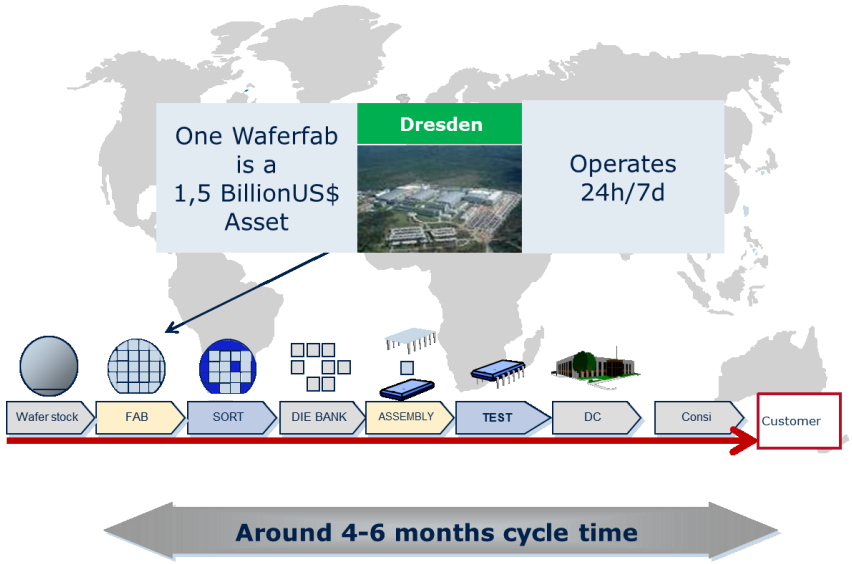
Employees

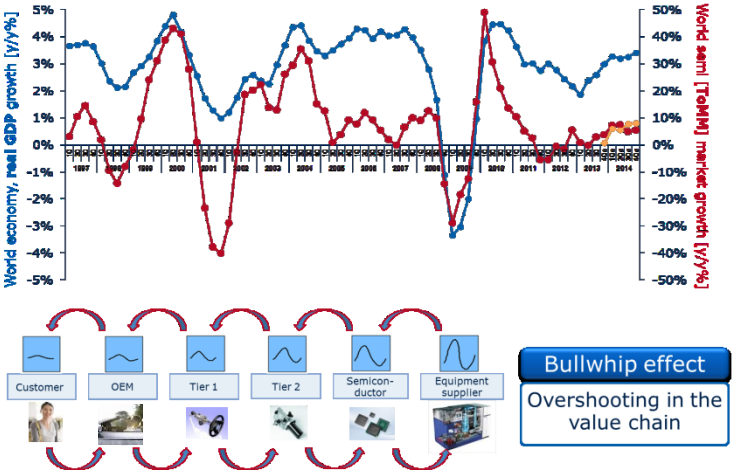
- Segment Result Margin*
- FCF from continuing operations
- Return on capital employed

*Segment result margin of respective Division or revenue-weighted average of all Divisions if employee works in Operations or Central Functions

Semiconductor industry characteristics

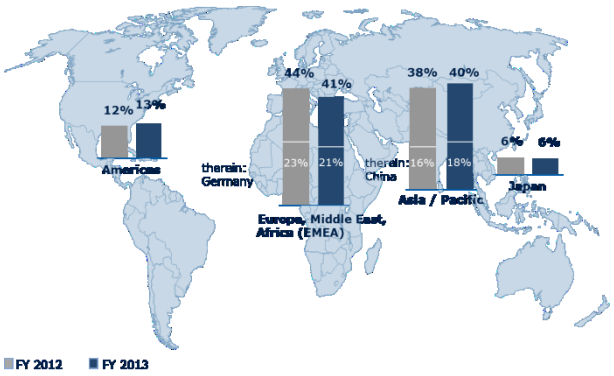
- Asset Intense Industry
- Long Production Lead Time
- Significant Demand Fluctuation
- Early in the Value Chain





Three major stakeholders in Infineon's planning process

Regions



Regional Account Teams

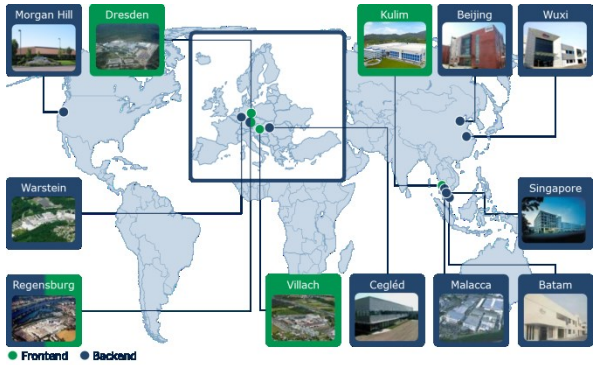
Uncapped Demand

Four Divisions

P&L Responsibility

Consolidated Demand and Release

Operations



Global Production and Distribution Network

Capacity & Supply

Stakeholders are aligned within one planning cycle

Planning Cycle

Demand

- Uncapped Demand Signal
- Price Planning

Load

- Consolidated but still Uncapped Demand
- Flexibility Planning
- Stock and Contingency Planning
- Review of Resulting Load to Resources

Capacity

- Invest Proposals
- Capacity Feedback

Adjust & Release

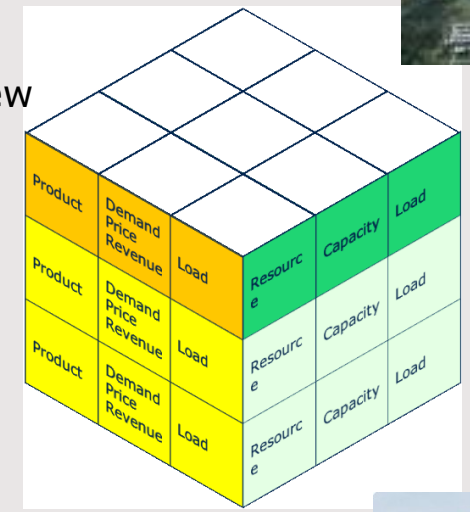
- Invest Decisions/ Reservations
- Adjusted Plan for Demand, Load and Capacity

Multidimensional big picture within online planning cube for integrated decision making

Demand	Load	Capacity	Adjust & Release

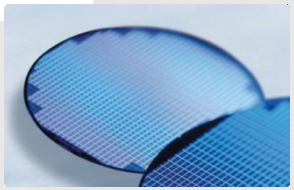
Demand/Product View

- Volume, Price, Revenue
- Region, Currency



Resource View

- (Allocated) Capacity
- Reserved Capacity
- Idle Capacity

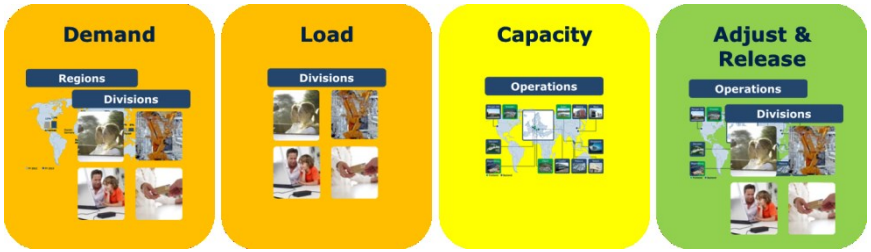


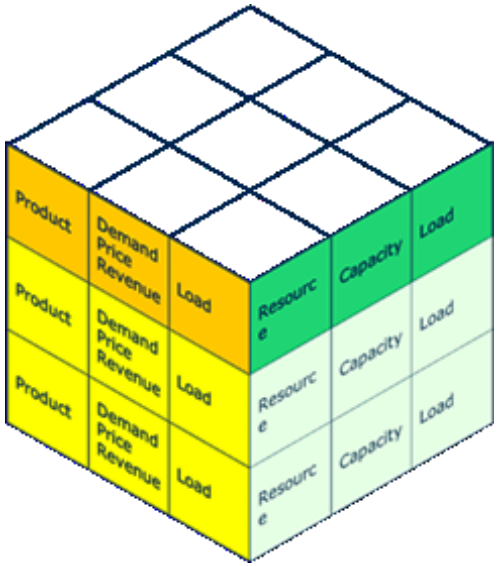
Load View

- Load for Revenue
- Load for Stock
- Inventory

All Planning dimensions are available and aligned at all planning steps

Adding Financial Key Parameters to Planning Cube translates it into a Financial Statement





Financial Parameters

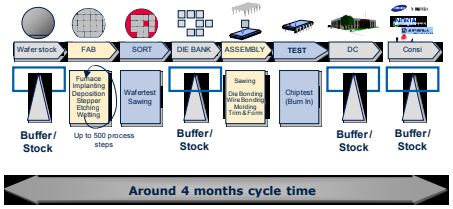
Sourced from Finance Systems

- Price per Piece
- Cost per Piece
- Cost per Idle Capacity Unit
- …

Volume related inputs to Financial Forecast Statement

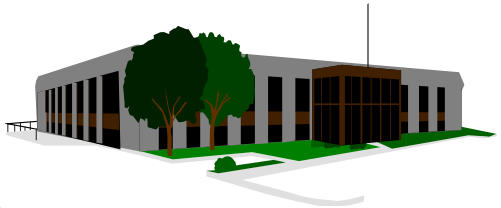
- Revenue
- Cost
- Margin
- Idle Cost
- Inventory Value
- …

Multidimensional picture for controlling landscape



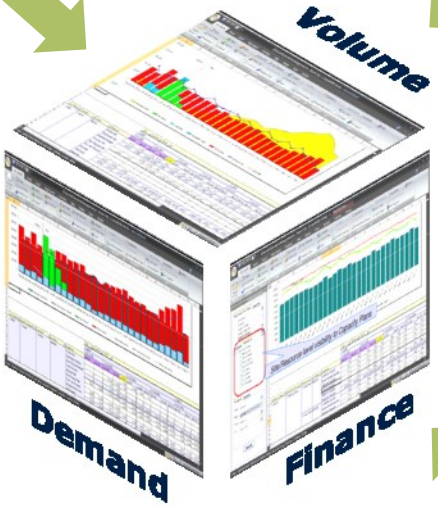
Production Network

- Flexibility
- Stock development



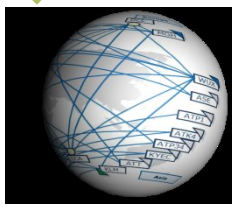
Production Site

- Capacity
- Utilization
- Idle Cost
- Necessary Invests



Customer Demand

- Volume
- New Products



Product

- Currency
- Regional Split
- Price
- Cost of Sales

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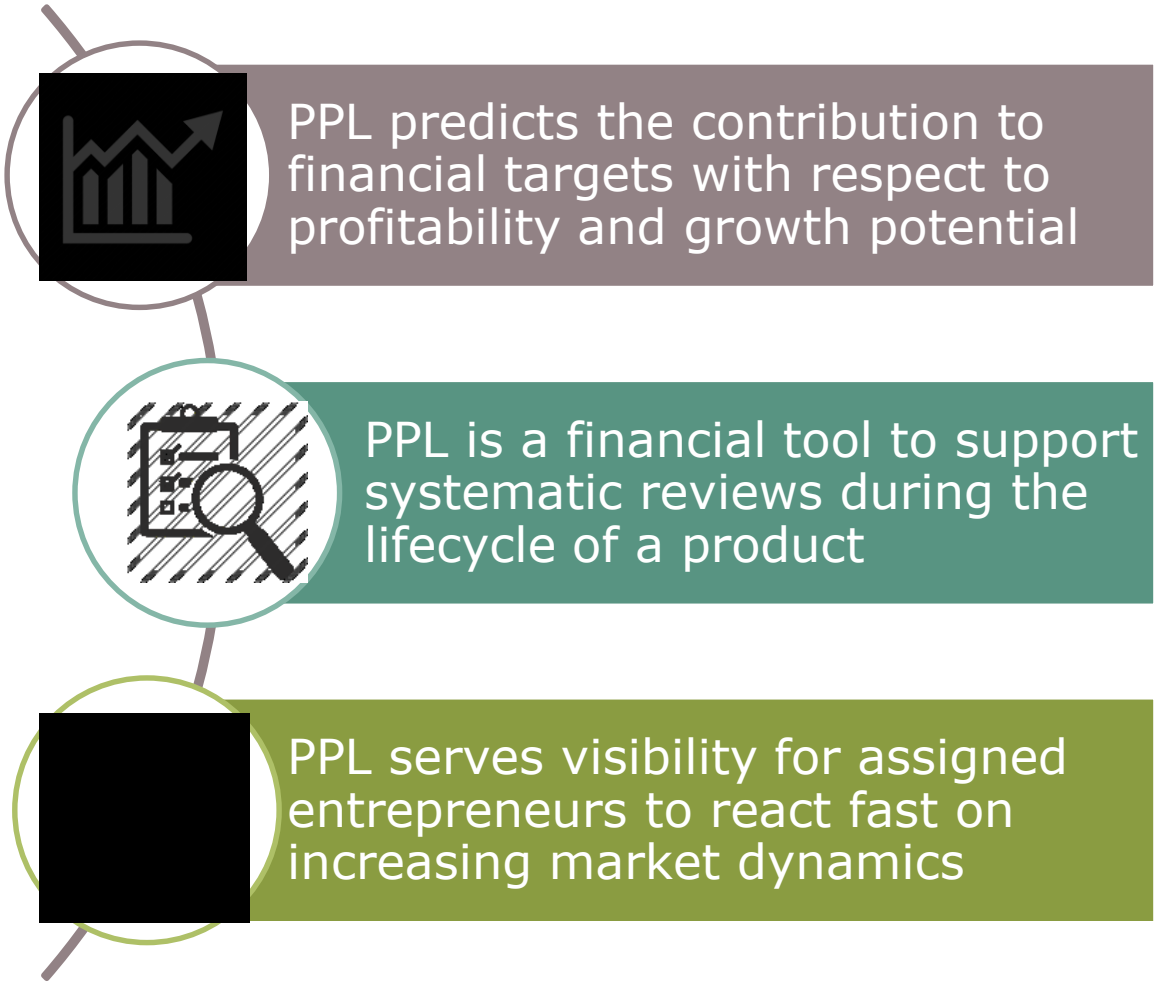
Purpose of a Product Plan - PPL



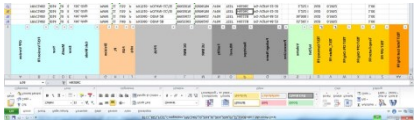
A PPL is a joint commitment of…

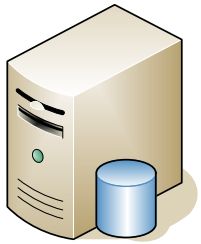
- Sales & Marketing on future customer projects in terms of price, volume and product specifications
- Operations regarding future manufacturing cost
- R&D regarding project timeline, resource commitment and project cost development
- Finance

Replace excel by a system – the three key elements of ePPL 2.0

Data sources	Calculation Tool	Reporting

OCC





ePPL 2.0 DB

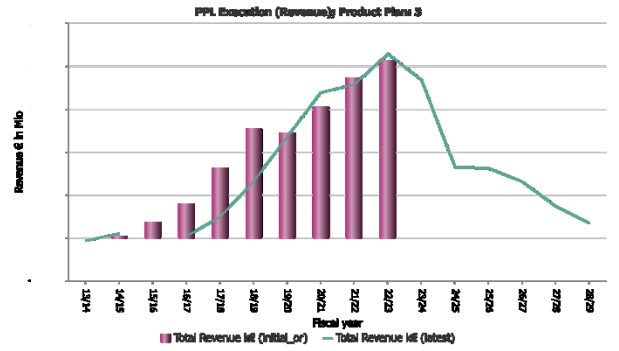
BI Portal

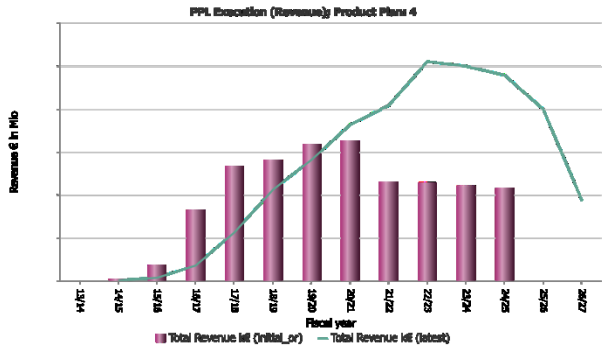
KLUSA Plan. Decide. Succeed.

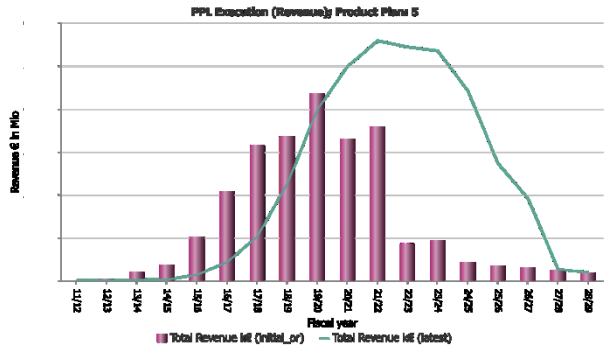
SAP Business Objects

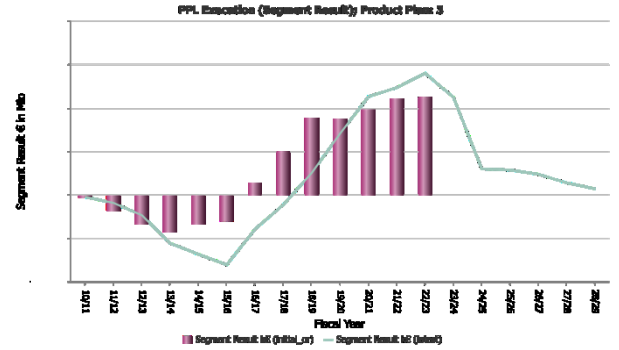
KPI: PPL Execution

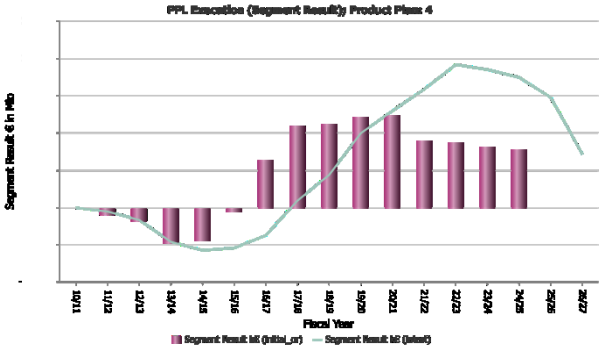
Product Segment A	Product Segment B	Product Segment C

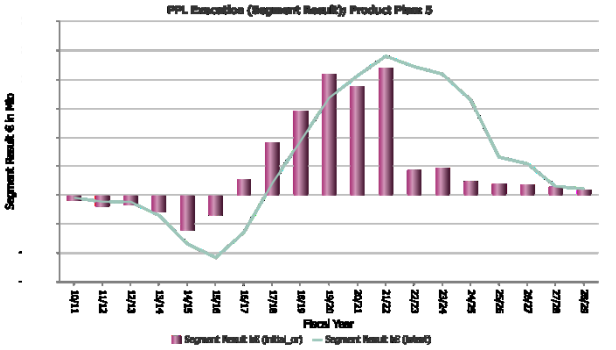










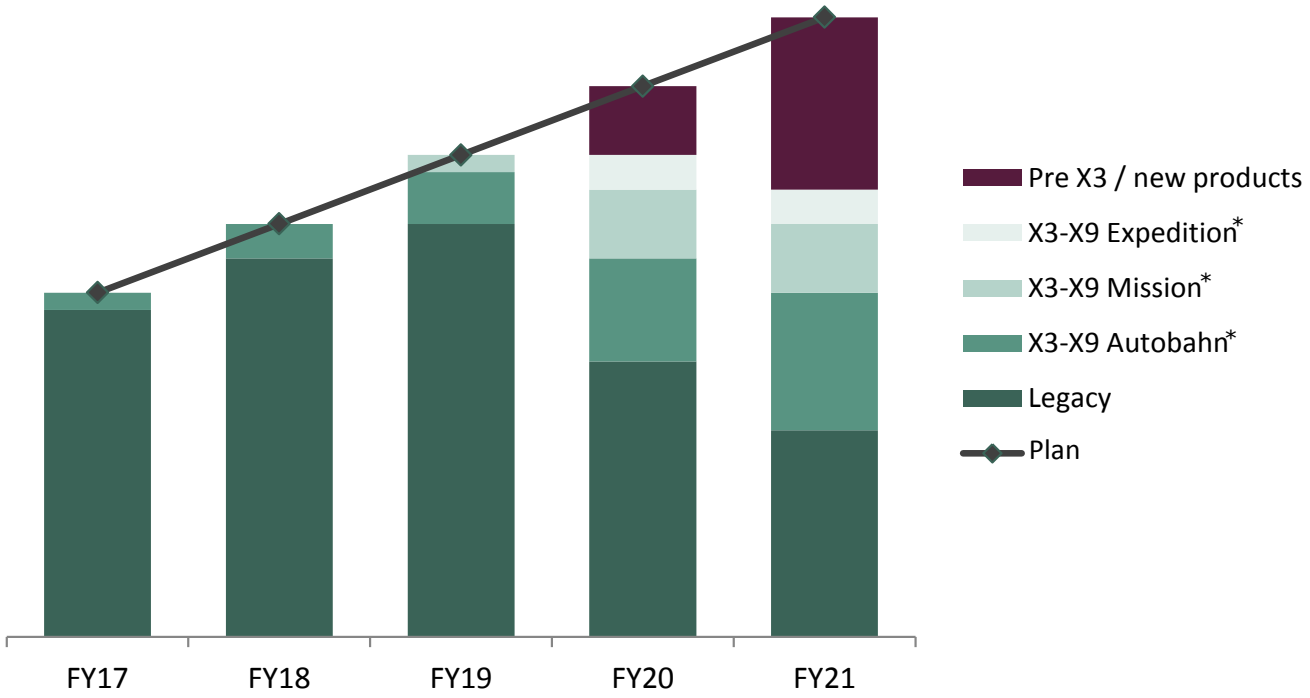


- Measure for project planning accuracy
- Measure for actual time-to-market

MI: Strategic 5-year plan vs. R&D pipeline coverage

How much revenue is planned with products which are currently under development (Milestone 3- Milestone 9) during 5-year planning timeframe, what is the risk profile (execution, time to market) of the plan

Measurement: Coverage of revenue with products currently under development



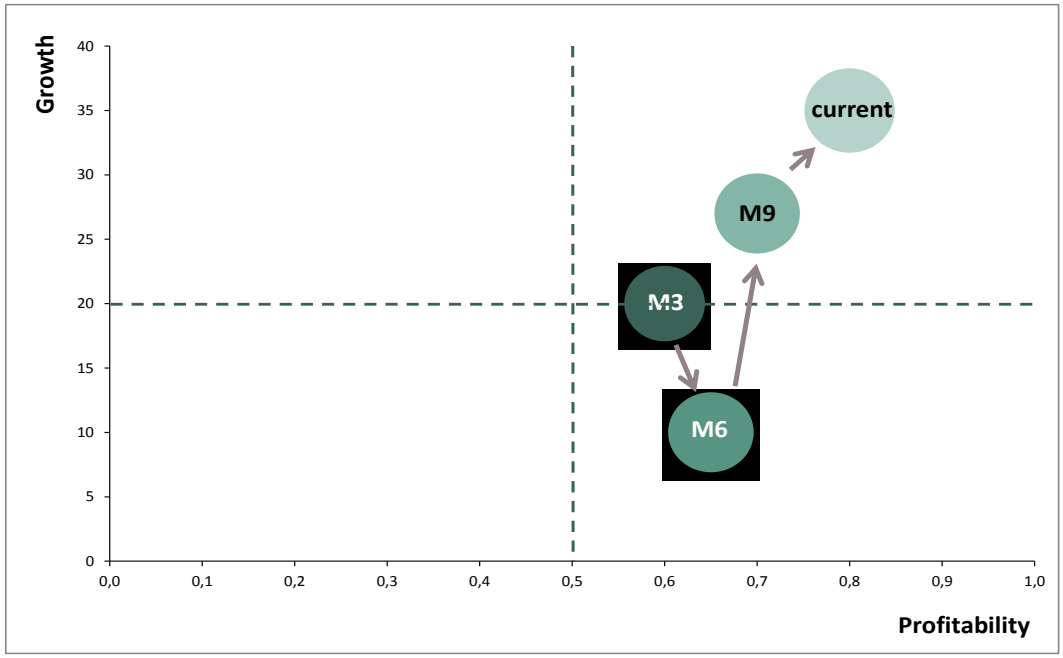
Project categories: 1) Expedition: Dynamic boundary conditions, high level of uncertainties. 2) Mission: Possible changes to boundary conditions, significant but manageable uncertainties. 3) Autobahn: Stable boundary conditions, low level of uncertainties.

KPI: Conversion rate of R&D into revenue

How does a project/product contribute to growth and profitability of a Division/Business Line/Product Line?

What is the conversion rate of an R&D investment into revenue, what is the profitability compared to the segment targets / expectation?

Measurement 1:	Conversion rate of 1€ project specific R&D into X€ cum. revenue
Measurement 2:	øproduct-cost-margin of product/project compared to targets in 5y-plan
Measurement 3:	Planning stability between Milestone 3 and Milestone 9



Div / BL / PL specific aggregation

Lessons learned during PPL roll out

- Ease of use and value add required to provide incentive for adoption "bottom up"
  - Certain simplifications to be jointly agreed in the finance community to reduce the degree of complexity
  - Data available in other systems needs to be automatically fed into the system to reduce workload
  - User interface needs to be convenient and fast
- Tone from the top both by the technical and finance side required to support roll out "top down"
  - Improved transparency in an area which is at the core of the decision power of the divisions not always welcome (potential fear of increased top down interference)
  - It takes a considerable time before contents provide full benefit in terms of controlling

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Proliferation of data has the potential to change how we think of business strategy

The quantity of data that is generated today and has become available

VOLUME

The speed at which data is generated has increased vastly

VELOCITY

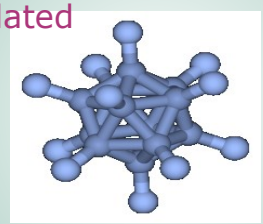
The sheer variety/types of data that is available today has increased

VARIETY

The inconsistency which can be shown by the data at times

VARIABILITY & INCONSISTENCY

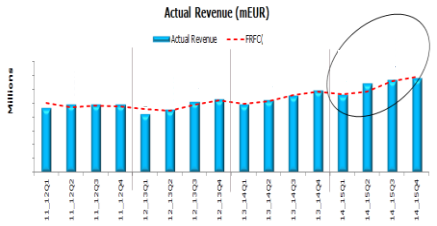
The data is often unstructured and not linked, connected or correlated



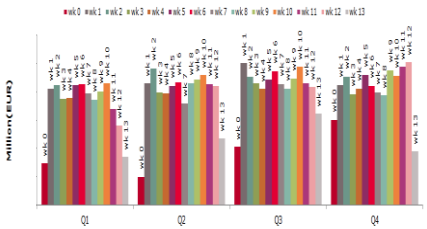
COMPLEXITY

Exploratory Data Analysis
A few of the key data points considered

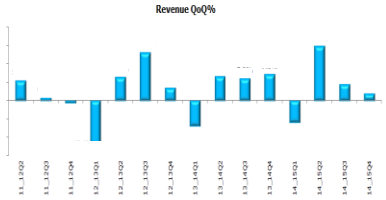
Revenue Trend Analysis (Yearly)



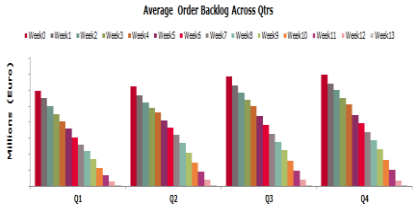
Revenue Trend Analysis (Quarterly & Weekly)



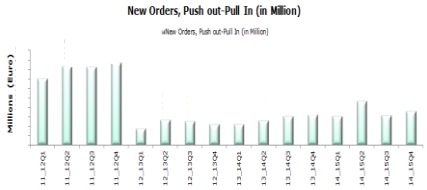
Quarter on quarter Trend Analysis



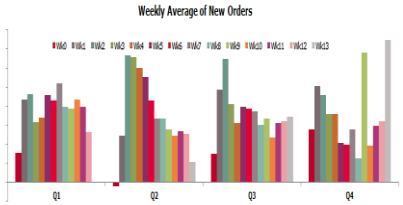
OBL & CU_FC Trend Analysis (Q'ly & W'ly)



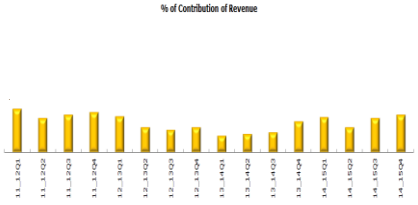
New Orders Trend Analysis (Quarterly)



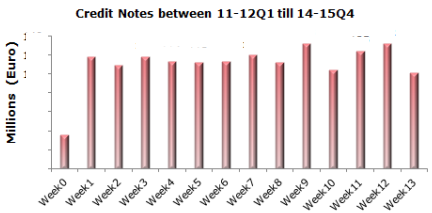
New Orders Trend Analysis (Weekly)



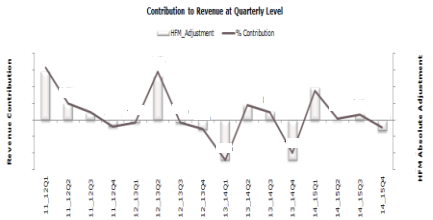
Order cancellations Trend Analysis (Q & Wly)



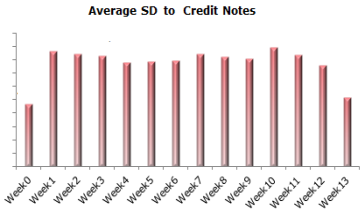
Credit Notes Trend Analysis (Q'ly & Weekly)



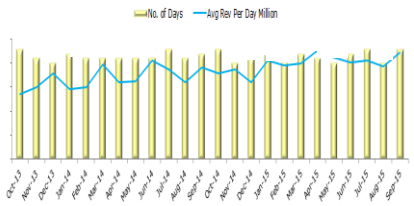
HFM Adjustments Analysis



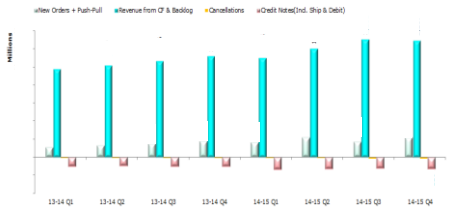
S&D Notes Trend Analysis (Q'ly & Weekly)



Number of Days (Sales) Impact on Revenue

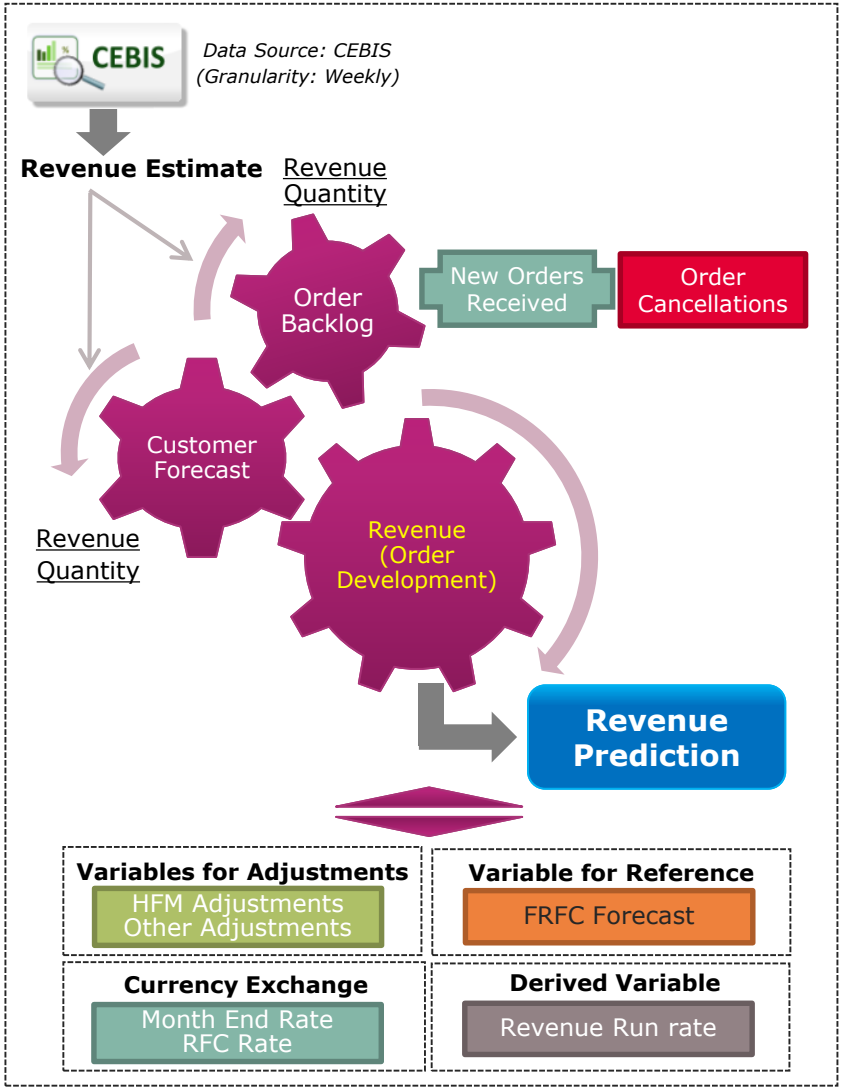


Revenue Composition Analysis



Infineon Group revenue prediction model construct

Model Construct



IFX Group Prediction Model: Major Features

I. Consistent Data Integrity & Quality checks and Profiling

II. Variable / Feature selection and extensive Exploratory data Analysis

III. Quarterly & Mid-Quarter Iterations with close feedback loops and Regular model evolution

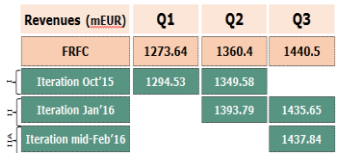
IV. Emphasis on 'Complexity reduction', 'Mathematical validation' & 'Avoidance of over-fitting`

V. High levels of Prediction Accuracy with Actionable Insights

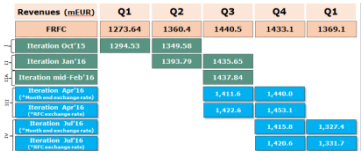
VI. Embedding the Outcome of the Analytical Model in IT Solutions for Business consumption

IFX Group Revenue Prediction Model
Multi-iterations with High Prediction Accuracy

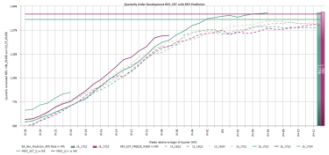
	Base Model	Advance Model	Operatio-nalization (Advance Model)	Next Level
	Model with core variables: Cash Flow, Order Backlog, New Orders, Credit Notes & Order Cancellation etc.	Two distinct prediction models for euro and non-euro 'Revenue' components; using Month-end Exchange Rate & RFC Exchange Rate	End to End automation and result integration with CEBIS	*In – Progress* Advance Algorithm and Model Refresh
	Iteration – I & II Oct'15-Jan'16	**Iteration– III, IV, IVA, V** Apr'16-Jul'16-Oct'16	**Iteration – VI, VIA** Jan'17	**Future Iterations..**
Prediction Accuracy	**Oct'15: 0.7%** **Jan'16: 1.5%**	**Apr'16: 1.8 -2.6 %** **Jul'16: 0.7 - 1%** **Oct'16: 1.3 – 2.4%**	*to be updated after FY1617 Q2 Closure*	



Revenues (mEUR)	Q1	Q2	Q3
FRFC	1273.64	1360.4	1440.5
Iteration Oct'15	1294.53	1349.58	
Iteration Jan'16		1393.79	1435.65
Iteration mid-Feb'16			1437.84



Revenues (mEUR)	Q1	Q2	Q3	Q4	Q1
FRFC	1273.64	1360.4	1440.5	1433.1	1369.1
Iteration Oct'15	1294.53	1349.58			
Iteration Jan'16		1393.79	1435.65		
Iteration mid-Feb'16			1437.84		
Iteration Apr'16 (*Month end exchange rate)			1,411.6	1,440.0	
Iteration Apr'16 (*RFC exchange rate)			1,422.6	1,453.1	
Iteration Jul'16 (*Month end exchange rate)				1,415.8	1,327.4
Iteration Jul'16 (*RFC exchange rate)				1,420.6	1,331.7



Thank you for your attention

Part of your life. Part of tomorrow.

Infineon