

# Infineon

## Pioneering 300 Setting the Pace for Semiconductor Manufacturing

December 12, 2001

### Operational Excellence at Infineon Technologies

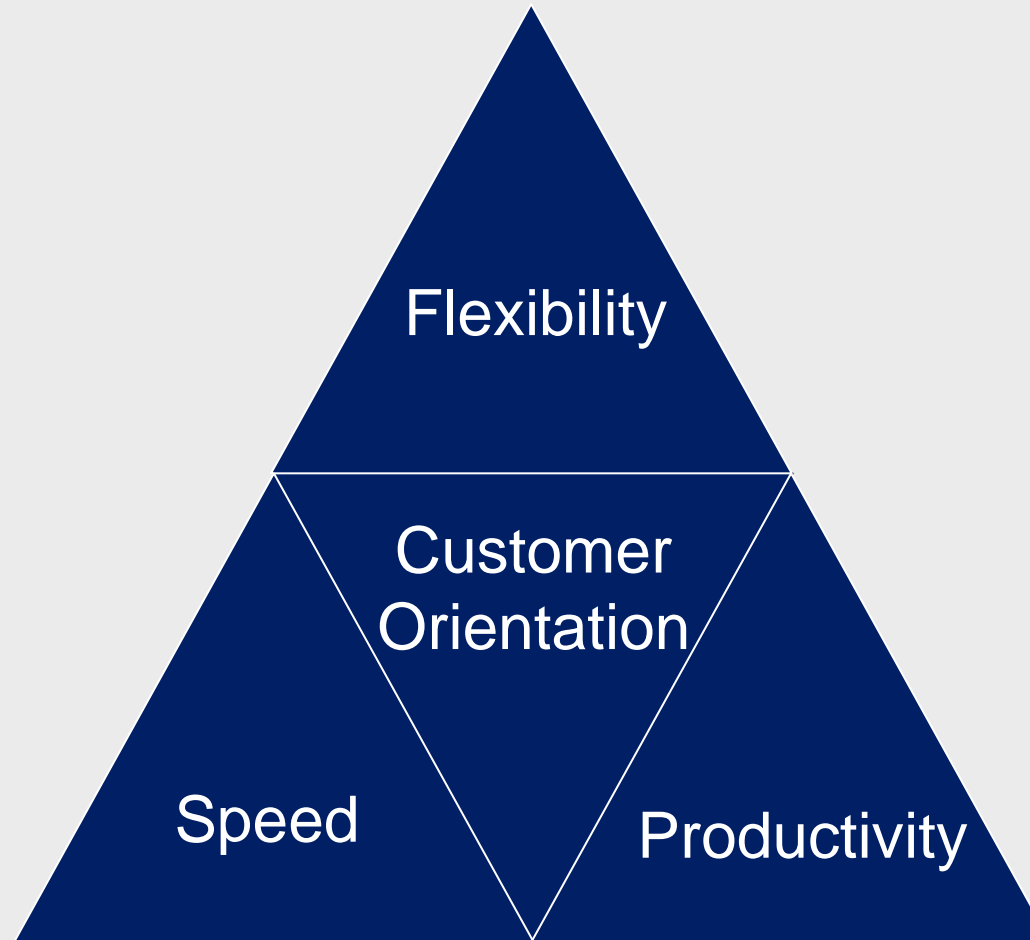
Dr. Andreas von Zitzewitz  
Chief Operating Officer



Never stop thinking.

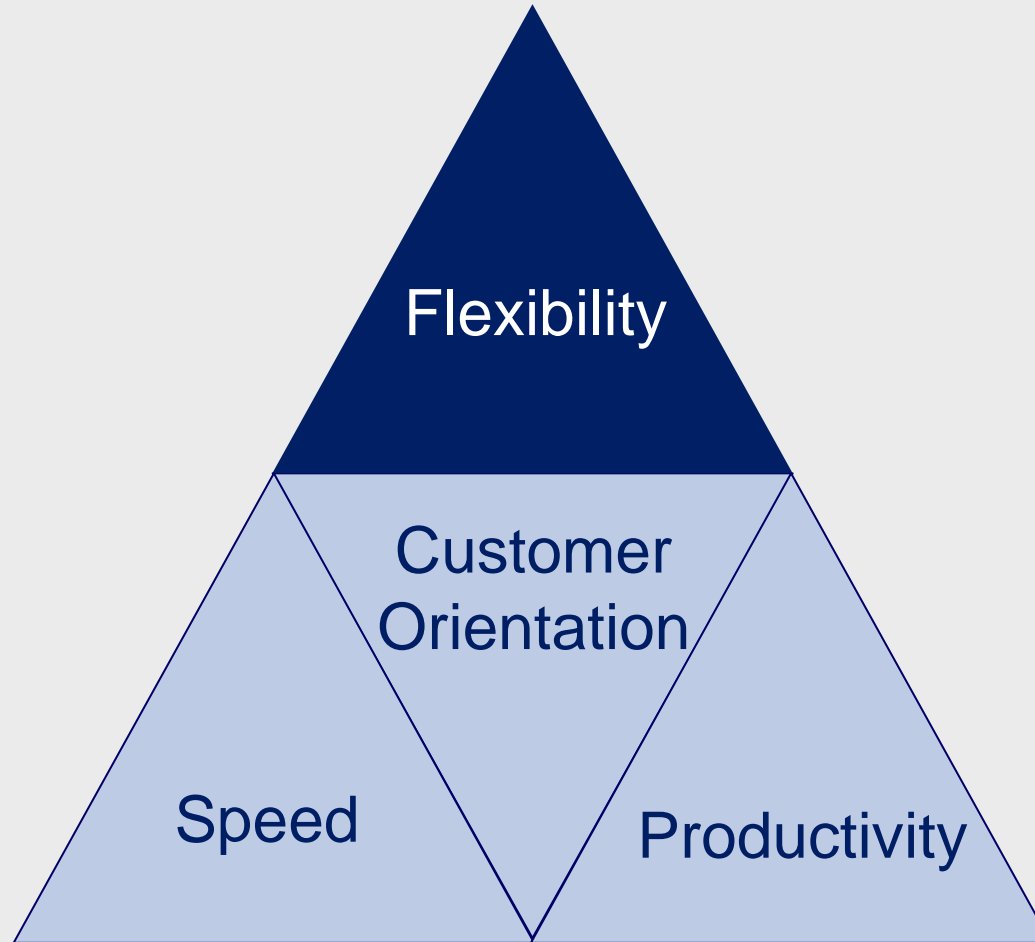
## Operational Excellence at Infineon: The Four Cornerstones

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# Maximize Manufacturing Flexibility

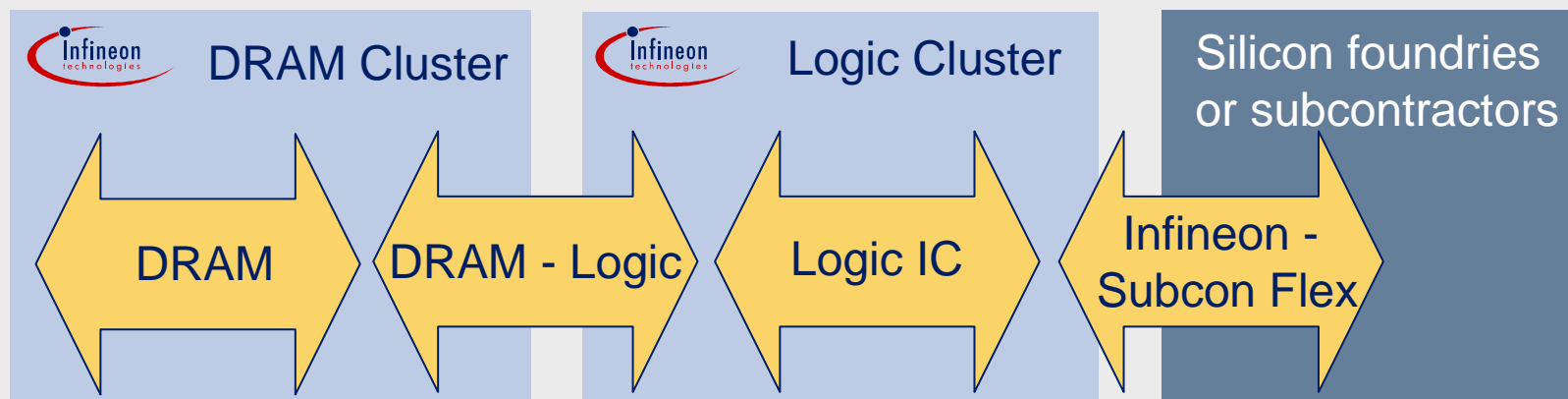
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# Optimized Manufacturing Flexibility

**Flexibility = maximize opportunities of upturns / minimize impact of downturns**

- Internal flexibility: DRAM Cluster, Logic Cluster and flexibility in between
- External flexibility: Silicon foundries and subcontractors are important components in Infineon's manufacturing landscape



 **Loading flexibility**

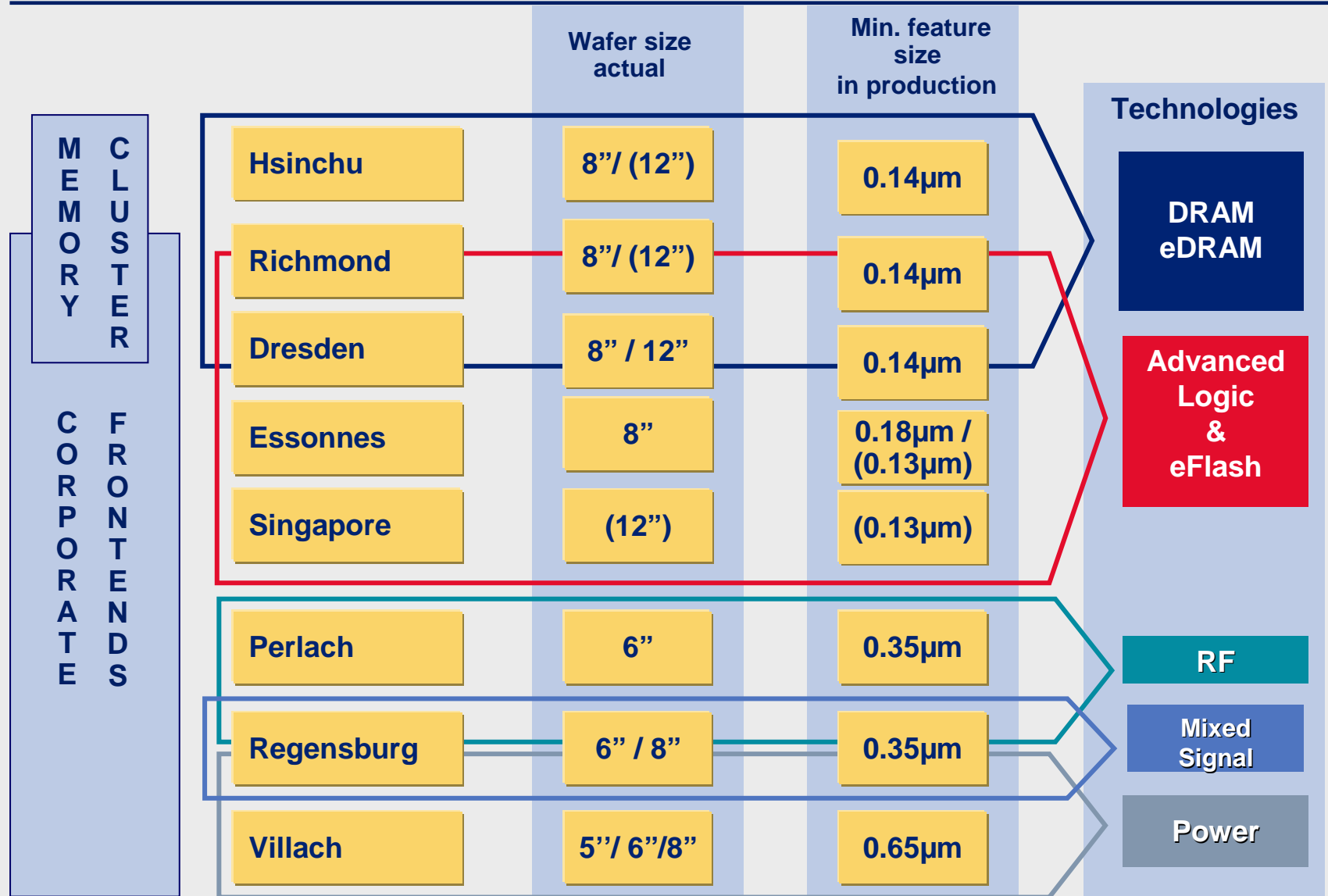


# Infineon's Production Capabilities: A Broad Spectrum from DRAM to Radio Frequency Chips

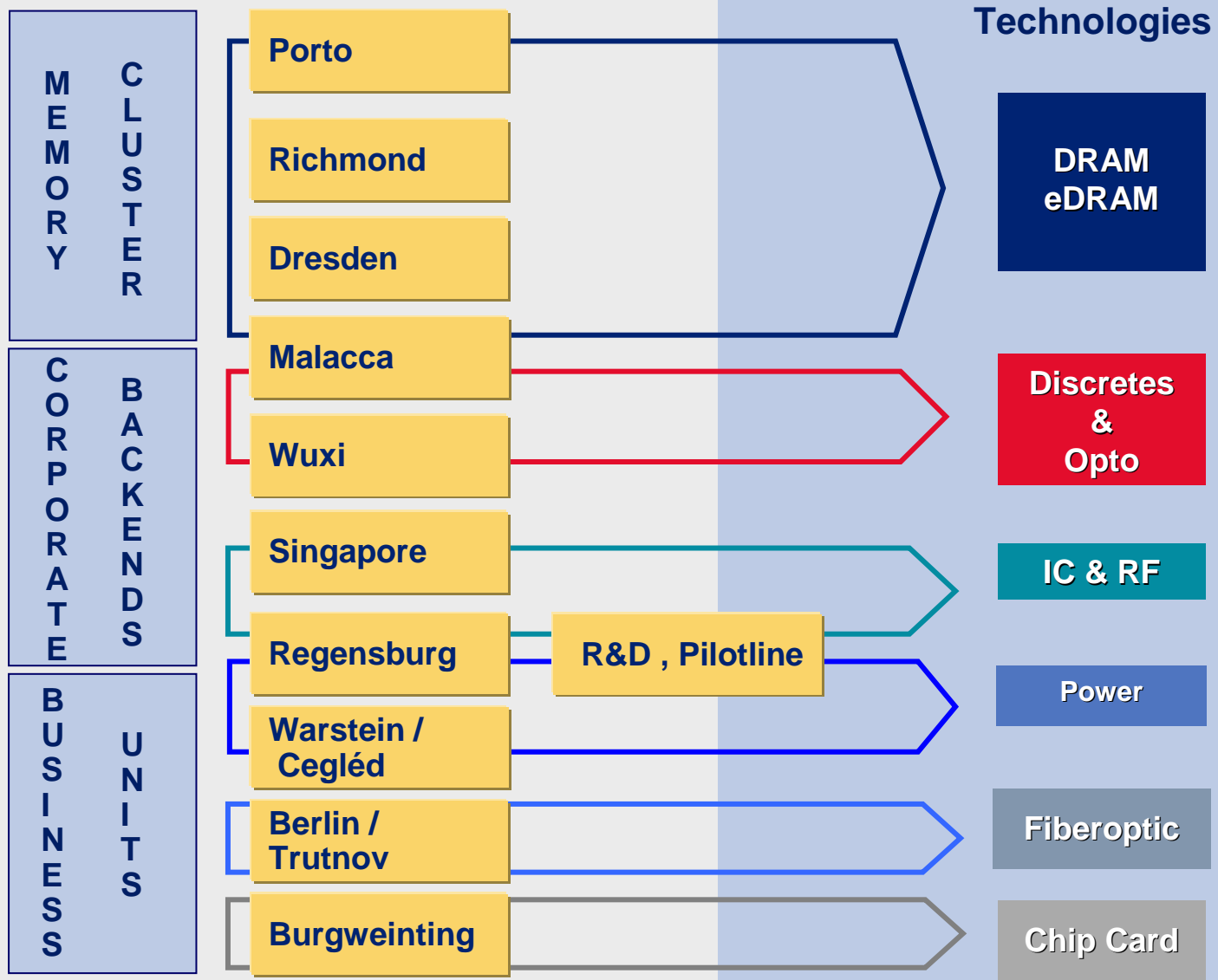
	DRAM	Emb. DRAM	Logic CMOS	Analog CMOS	Emb. Flash	RF BiCMOS	Bipolar	SiGe	GaAs

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# The Infineon Frontend Manufacturing Network



# The Infineon Backend Manufacturing Network



# DRAM Production Flexibility - A Proven Concept since 1998

## The DRAM Fab Cluster

**Frontend-  
wafer  
production**



Global process synchronization

Common technological roadmaps

Identical quality

**Backend-  
assembly /  
test**



**One (virtual) fab to the customer**



# Flexibility between DRAM and Logic: An Operational and Strategic Concept

## Operational advantages

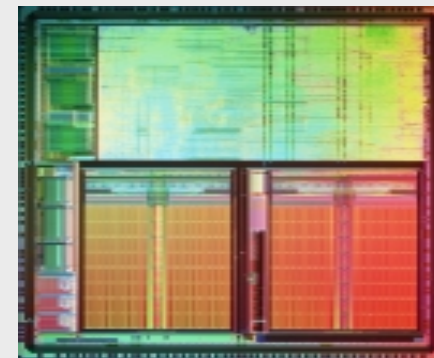
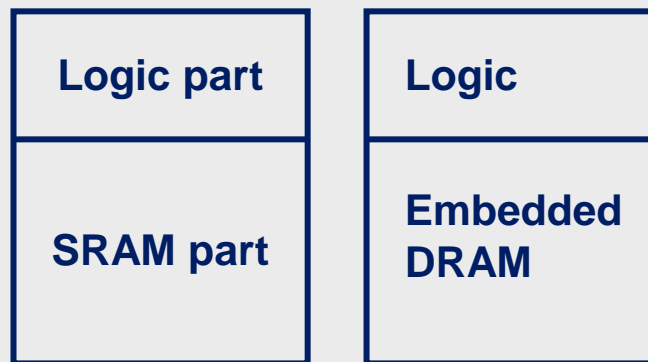
- DRAM as a forerunner in lithography and advanced tool learning
- DRAM as volume vehicle with excellent debug capabilities to tune and stabilize processes (logistics, equipment + utilization, technologies)
- DRAM production optimizes manufacturing processes - facilitated “break-in” for new manufacturing sites and teams
- Commodity DRAM allow to handle fluctuations in logic IC demand and to fill capacity for maximizing capital efficiency of fabs

# Flexibility between DRAM and Logic: Infineon's Operational and Strategic Concept

## Strategic advantages

- Flexible and gradual transfer of production from memory to logic ICs (e.g. fabrication in Dresden, Richmond and Hsinchu)  
80% of equipment is common to DRAM and Logic
- Ideal technological position for embedded solutions

**without eDRAM technology**      **with eDRAM technology**



**1 Mbit RAM**  **20 Mbit RAM**

# Strategic Partnerships in Technology Development and Frontend Manufacturing

## Partners in the development of leading-edge technologies

- IBM: Next generation DRAM and magnetoresistive RAM
- Toshiba: Ferroelectric RAM
- IBM and UMC: Advanced CMOS logic
- UMC: embedded flash
- Saifun: Mass storage flash

## Close cooperation with silicon foundries

- TSMC: Microcontroller
- ZMD: Secure memories for chipcards
- **UMC: Advanced CMOS and embedded flash**



## New Dimension of Partnership with United Microelectronics Corp.

### **Synchronization of development and manufacturing**

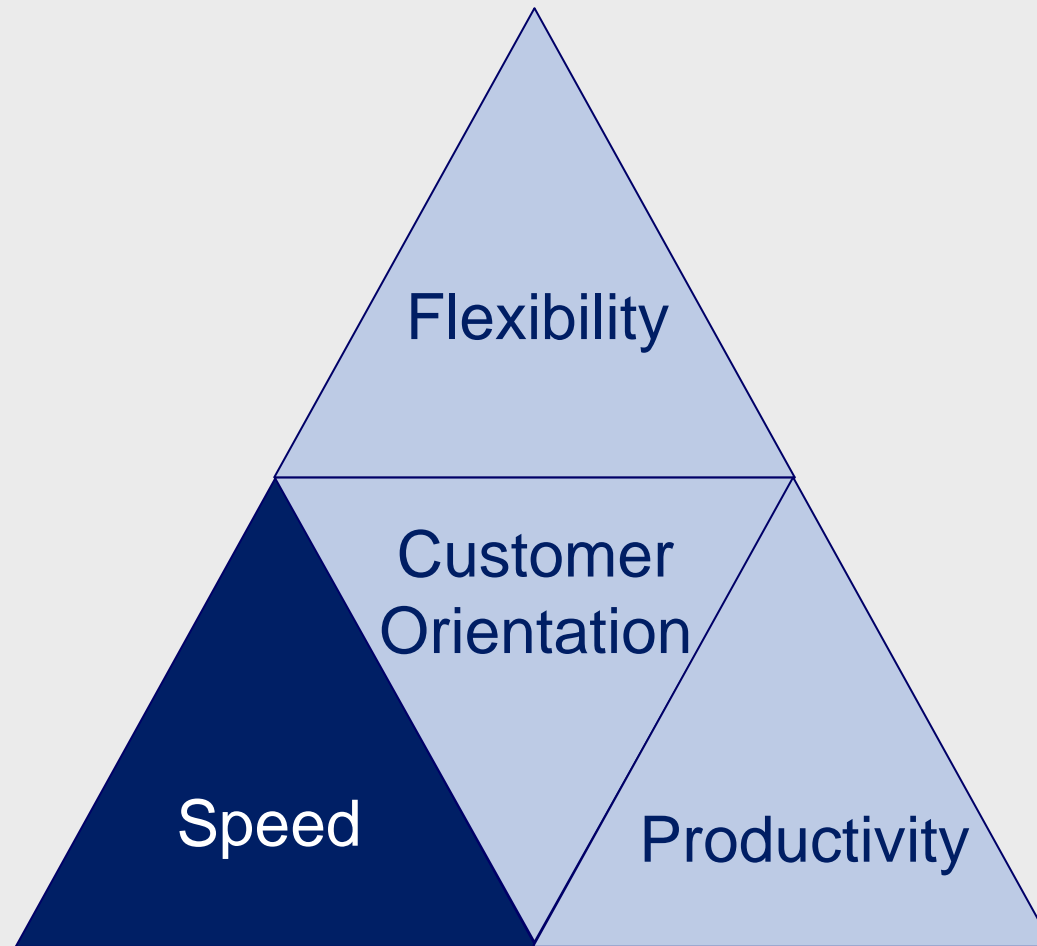
- Common development of advanced logic in IBM / Infineon / UMC alliance
- Fully compatible process implementation in Infineon and UMC fabs
- Extensive sharing of design platforms and libraries

### **UMCi - 300mm logic foundry (JV of Infineon and UMC in Singapore)**

- 2001 groundbreaking, 2003 start of operation
- Up to 40,000 wafers per month capacity
- Infineon: 30% equity, up to 37% access of capacity

## Uncompromised Speed in Operations

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## Time-to-Market is Key for Securing Market Share

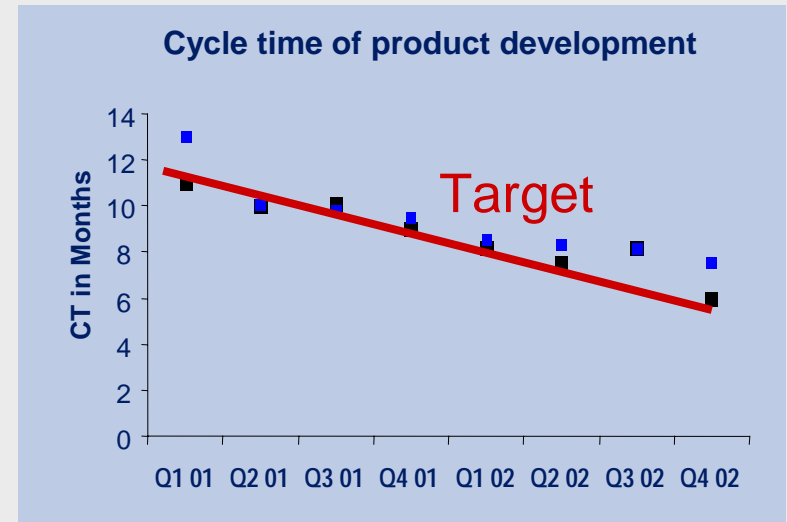
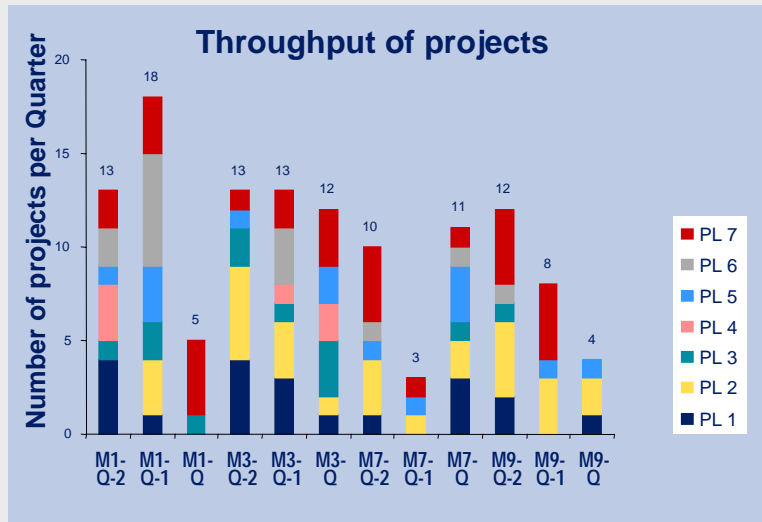
### Speed in technology and product development

- Manufacturing management methods implemented in our „Design Fabs“ to accelerate cycle time, throughput, and execution quality
- Reduced roll-out time of leading-edge CMOS technologies through development & manufacturing alliance with UMC
- Technology portfolio re-alignment program to create focus on top projects
- Currently reduced factory utilization is used for accelerated technology and product learning

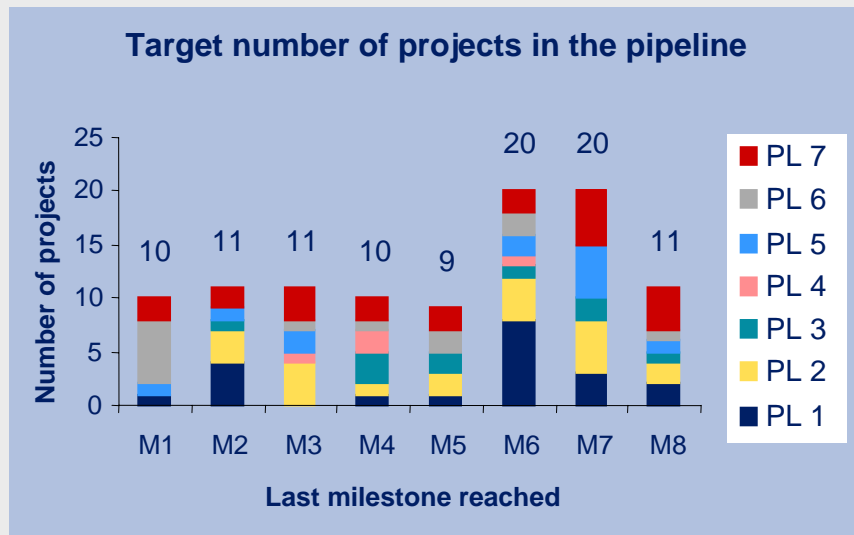
### Speed in volume ramp and improvement of yield

- Cluster concept for maximum synergy in yield management

# Factory Management for the "Design Fabs"



**Throughput capability and cycle time requirements determine target number of projects**



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## Tuning Critical Elements to Reduce Time-to-Market

### Speed in transfer of processes and synchronization

- Fast process transfers and alignment is the backbone of our Cluster Concept
- Establishment of an Infineon wide network of process experts to form transfer specific task force teams

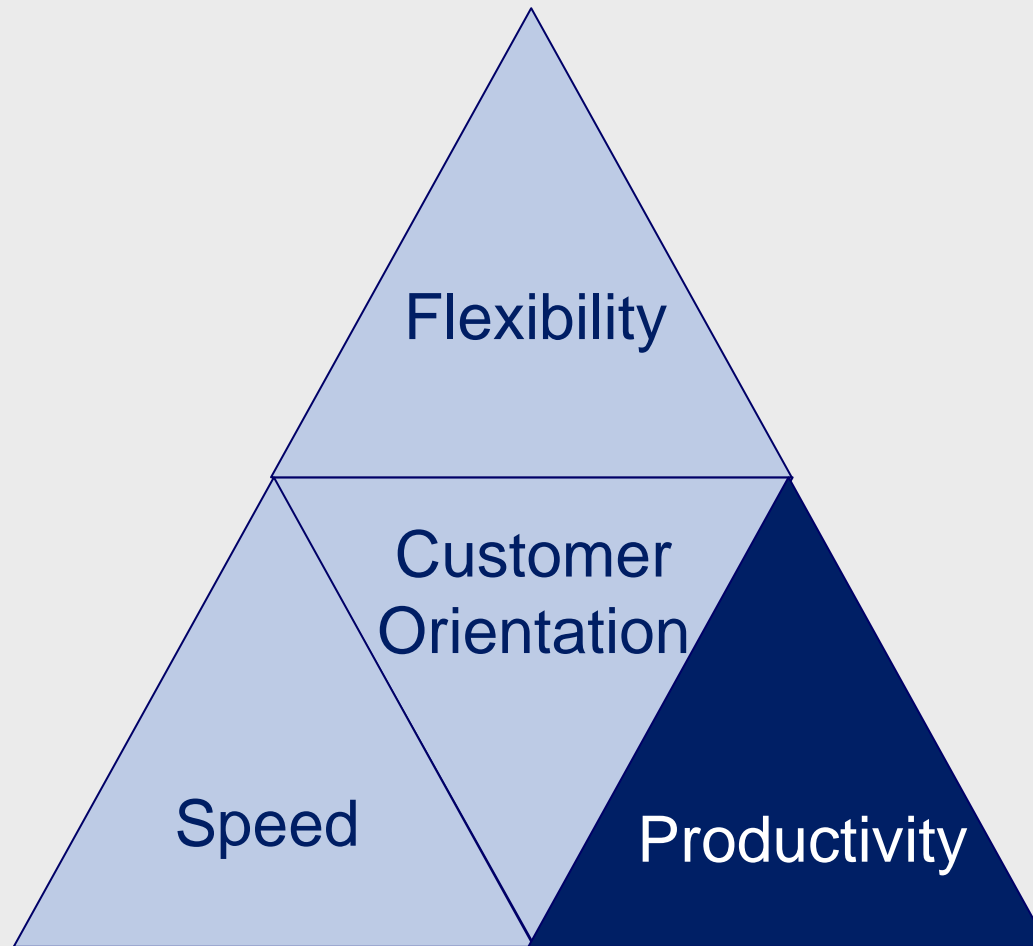
### Speed in manufacturing

- We are prepared to quickly grasp market opportunities
- Speed in manufacturing requires the optimization of procedures within a manufacturing plant
- Currently reduced loading is used to minimize idle-time between physical processing
- Improved speed will be carried over into the next upturn



# World Class Productivity

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## Components of Continuous Productivity Increase

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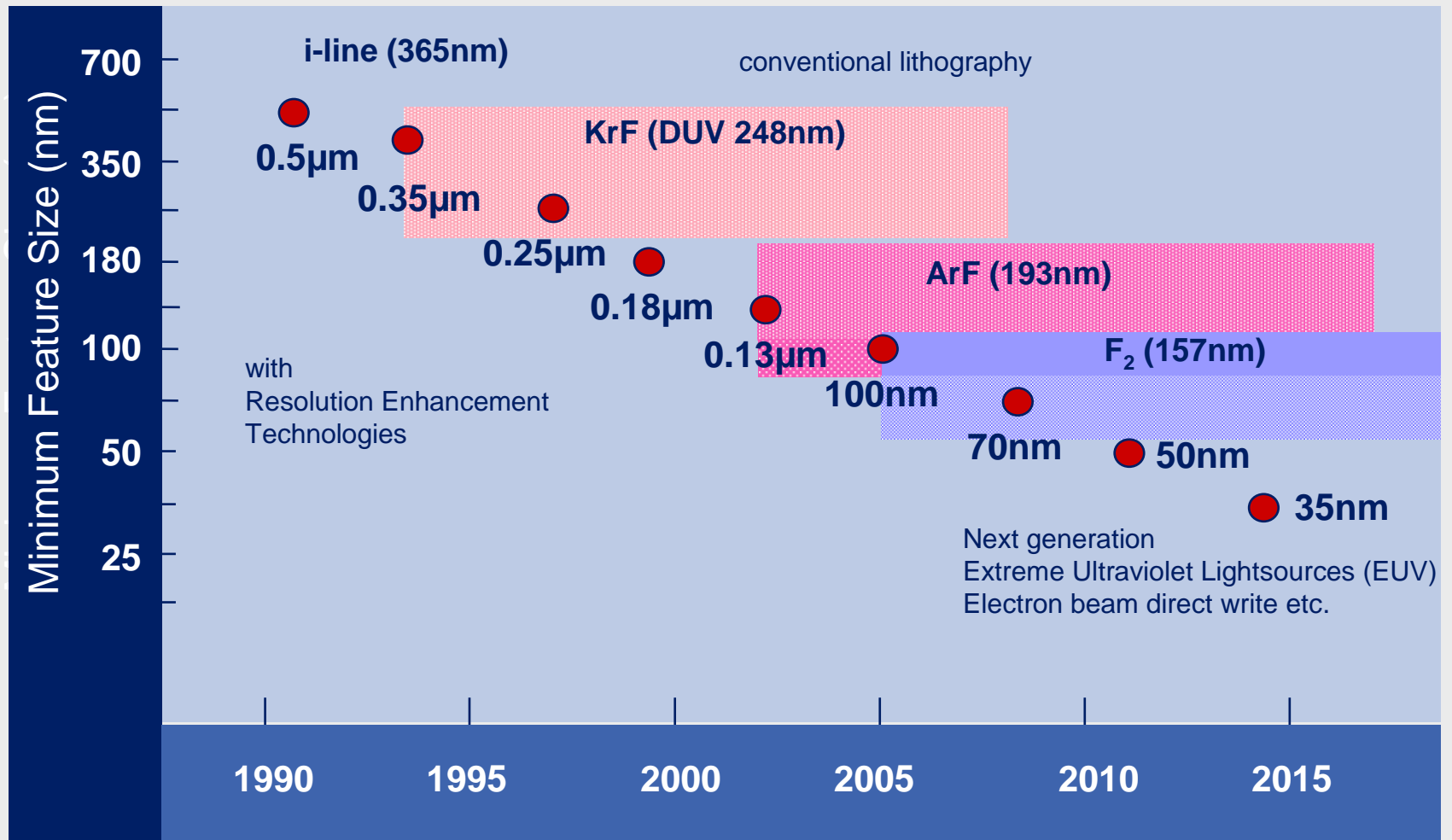
Chip-size shrink at leading-edge of industry

Cost benefit through head start in 12" technology

Continuous internal and external benchmarking

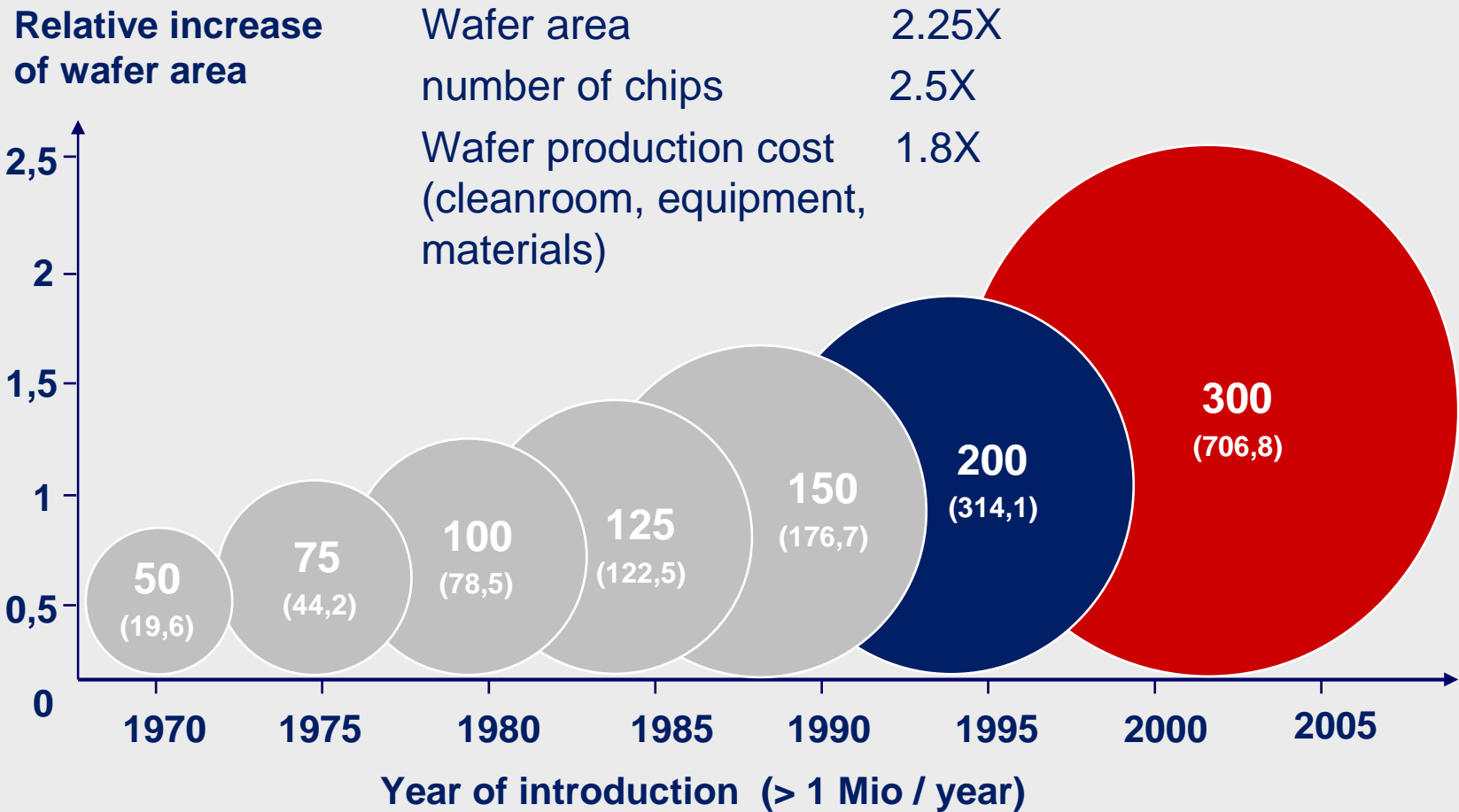
Optimized human and capital asset management

# Infineon's Technology Nodes at Forefront of Industry's Capability



# Benefits through Transition to 300 mm Technology

**Overall manufacturing cost per chip: 0.7X**



## Maximum Potential and Flexibility in 300 mm Production



**Dresden**



**Richmond, Virginia**



**JV ProMOS, Taiwan**

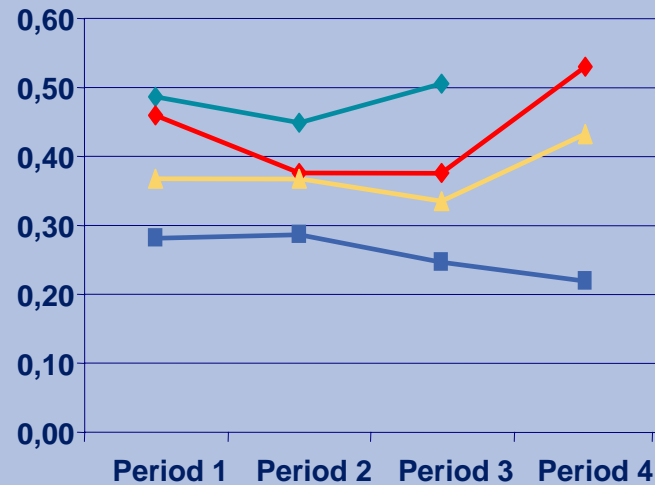


**JV UMCi, Singapore**

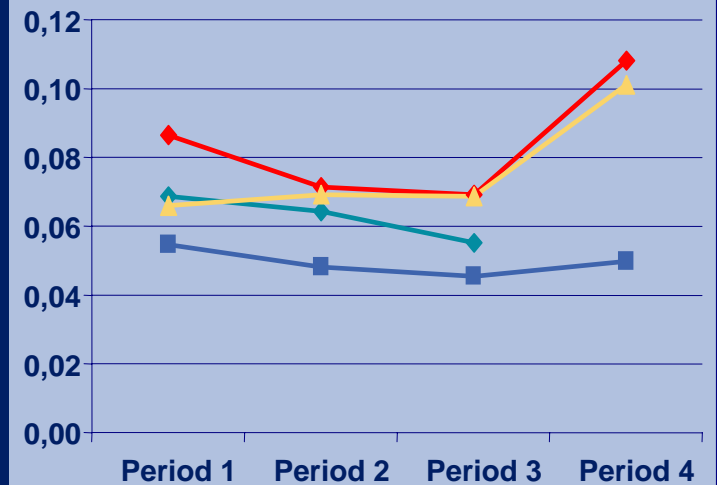
- Perfectly positioned for the next growth cycle
- Access to 4 fab modules
- Cost reduction per chip  $\geq 30\%$
- DRAM ramp with 256 Mbit in 0.14  $\mu\text{m}$  technology
- Advanced logic production in Cu and 0.13  $\mu\text{m}$  / 0.10  $\mu\text{m}$  in 2003

# Backend Benchmarking: Example of Productivity Leadership

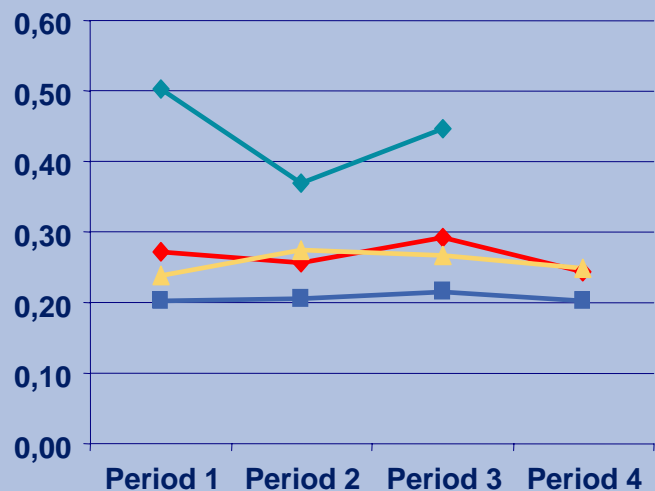
Personnel Eff. in rel. Units



Capital Eff. in rel. Units



Material Eff. in rel. Units



## Optimized Human and Capital Assets Management

### **Our world-wide workforce is our greatest asset !**

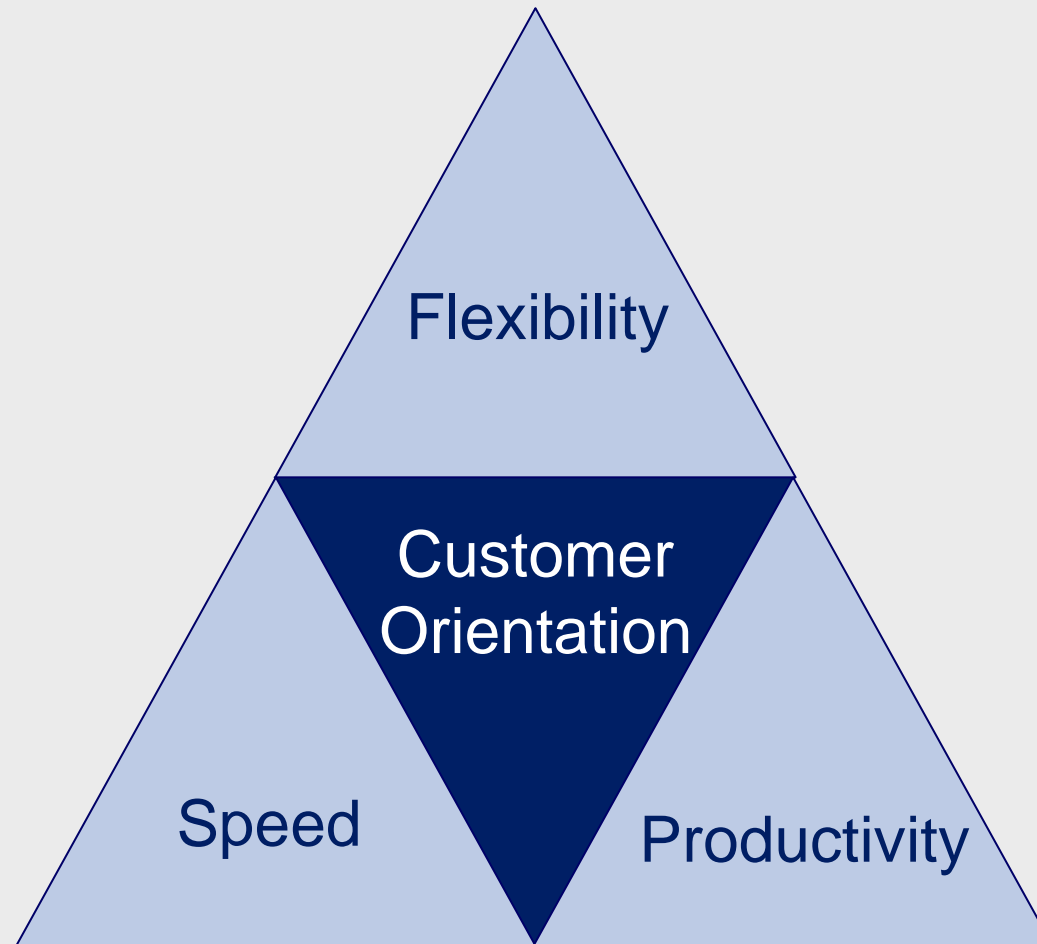
- Infineon offers and encourages career perspectives on a global scale
- Technical Ladder Program aims at world-class technical excellence
- Infineon's Job Rotation Program enhances knowledge exchange and best practice sharing

### **Smart and critical usage of capital assets**

- Infineon wide equipment planning and exchange system
- New Infineon wide procedure to maximize return of investment

# Customer Orientation

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## Customer Orientation is Our Central Focus

### Customer orientation in speed and reliability

- Uncompromised timely provision of samples and volume output
- Further refinement of Local Distribution Centers and Electronic Tracking System
- Target is 100% on-time-delivery and fulfillment of logistical commitments

### Customer orientation in quality and style

- Infineon wide quality enforcement and qualification procedure
- Customer Satisfaction Survey as the ultimate check-point of performance
- We want to achieve top supplier ranking at our key accounts
- We focus our energies to outperform our competitors !