TSMC SUPPLY CHAIN ANALYSIS

Presented By :

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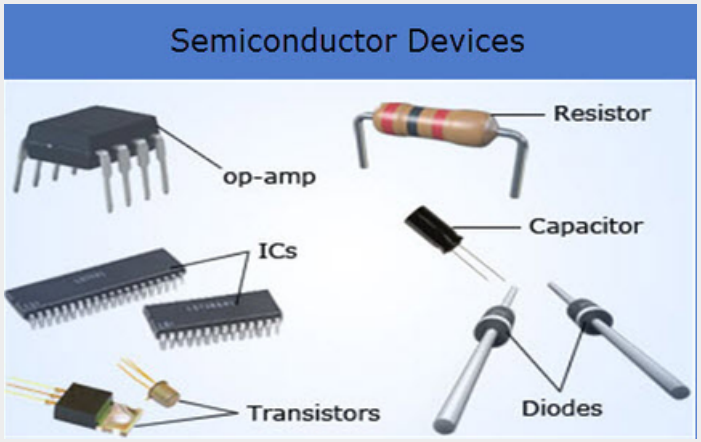
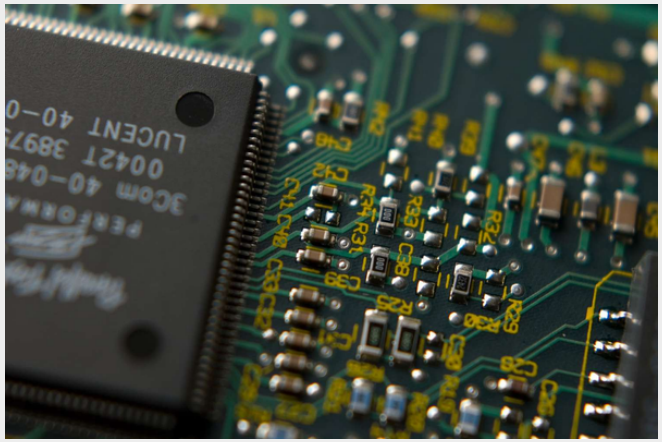
INDUSTRY ANALYSIS

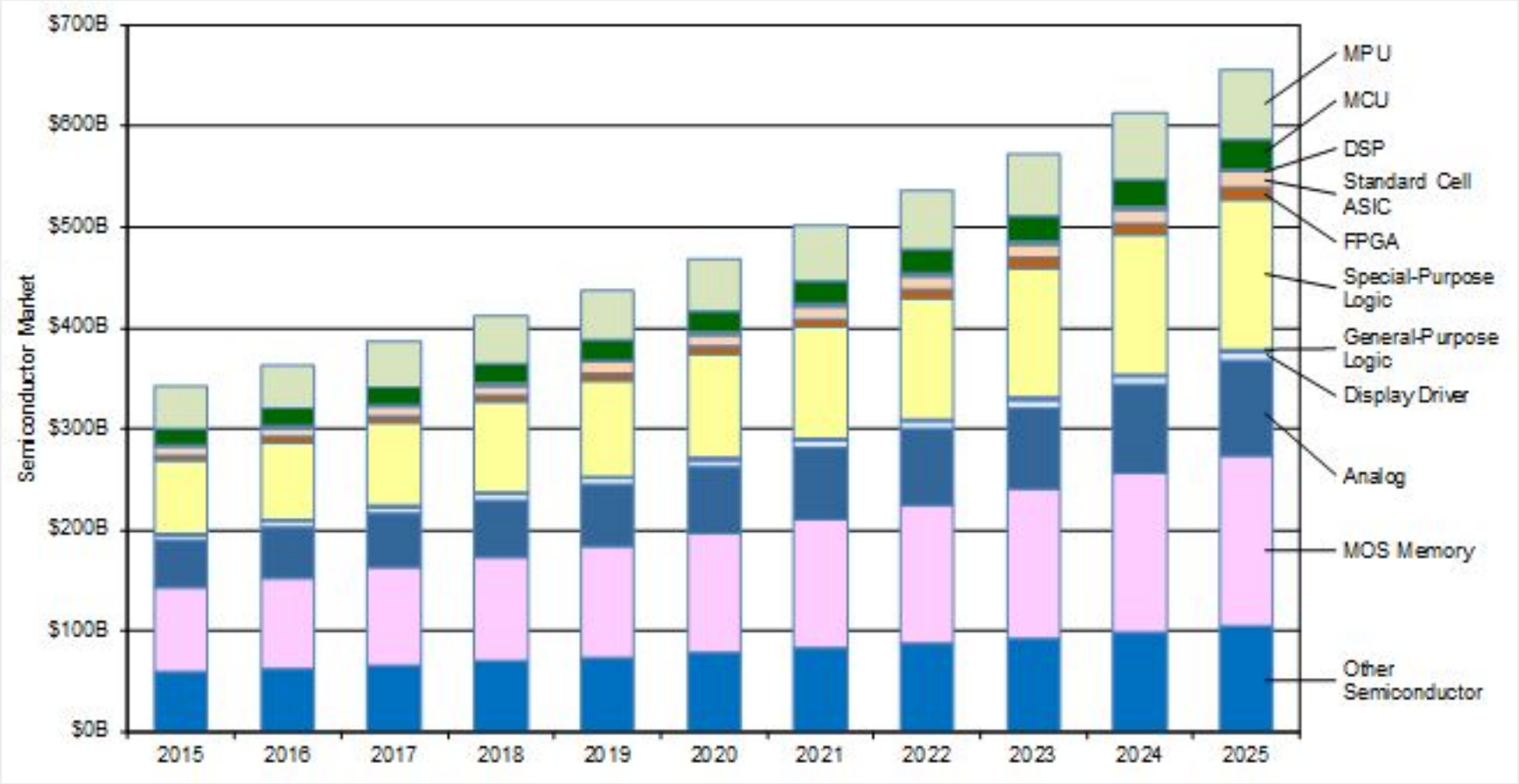
What are semiconductors, or 'chips'?



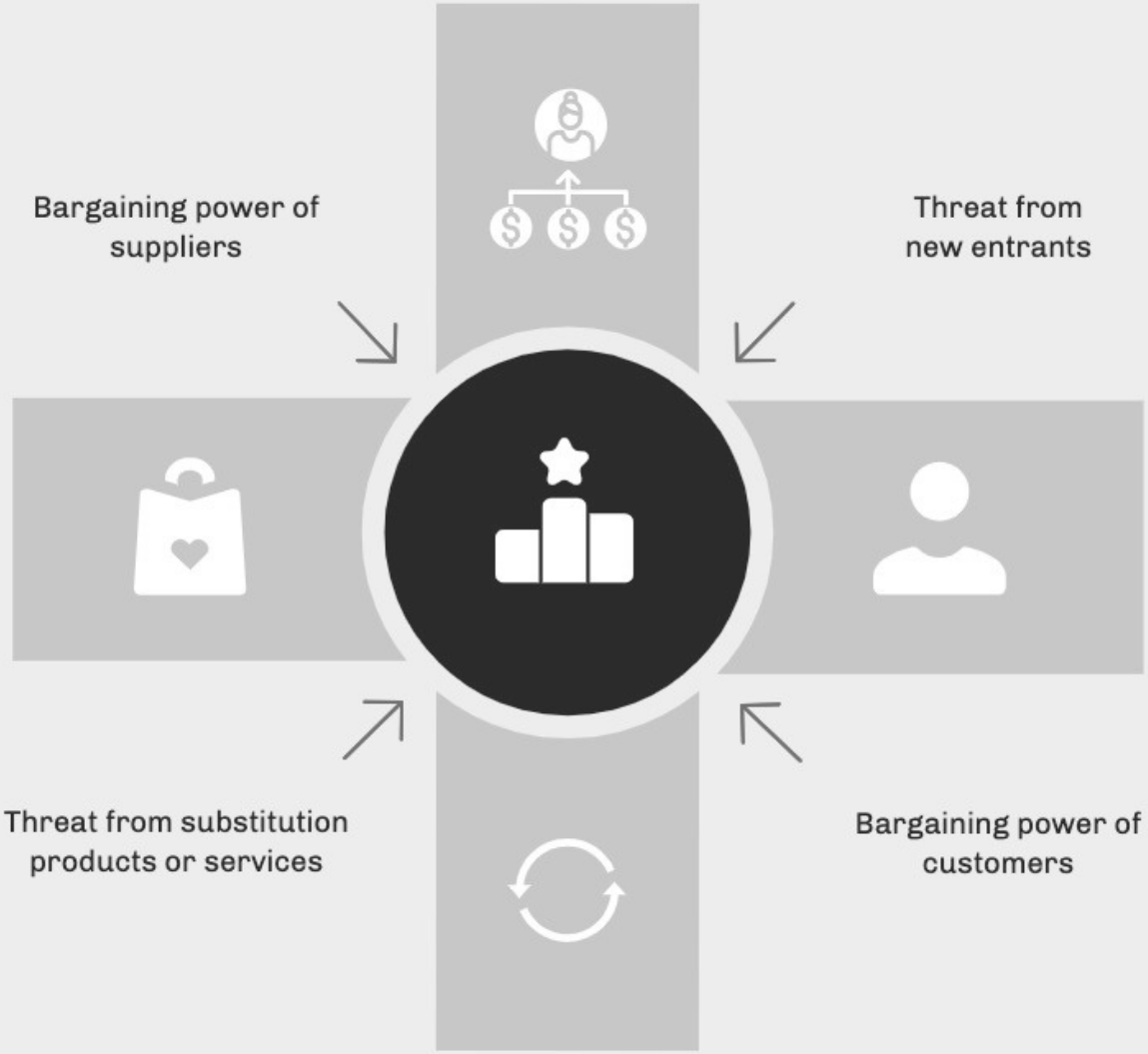


World's 4 most traded products - Crude Oil | Motor vehicles and parts | Refined oil | Semiconductors

Chip Manufacturing Industry Overview



Porter's Five Forces



Competitive Rivalry

All the firms have heavily invested in the industry it is difficult from them to leave the industry

Potential New Entry

1. Huge capital requirements
2. Legal barriers like Patent requirements
3. Economies of scale
4. Brand establishment

Buyers

1. Companies ability to influence product prices
2. Companies can demand better quality products

Suppliers

1. There are large number of suppliers
2. Tech specifications used in these products are standardised
3. IP rights does not allow forward integration to happen by the supplier

Substitutes

1. Semiconductor chips perform very specific tasks in a rigid computer environment, hence replacing them is difficult
3. Require special equipments to be constructed

Value Chain - Chip Manufacturing

Design

Chip Design

There are fabless companies and then there are fabs that manufacture chips for others

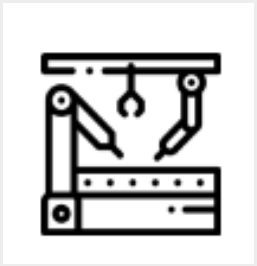
Software: EDA

EDA vendors get short innovation cycles, and work closely with fabs

Intellectual Property

Fabless companies, EDA vendors and IP providers all work closely together

Fabrication

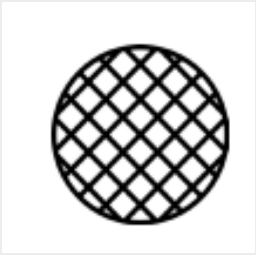


Fabrication

TSMC & Samsung are the market Leaders. These plants are called Fabs

Equipment

Most important part of the value chain due to Semiconductor manufacturing Equipments required



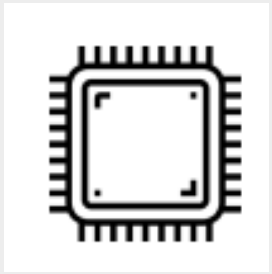
Wafers

Wafers are a key supply for fabs, and they are produced in several different sizes and types.

Chemicals

Chemicals suppliers work closely together with fabs and equipment manufacturers

Assembly



Assembly - by OSATs

- Assembly and test is labor intensive with typically lower profit margins
- Companies specialising in the back-end of the semiconductor production process are so-called Outsourced Semiconductor Assembly & Test (OSAT) companies

HOW DOES SUPPLY CHAIN ASSUME IMPORTANCE HERE?

Highlights of the Supply Chain (RTRPRL Framework)

- ***Demand Forecasting -*** Advanced technologies that use past-order data , customer financial statements, the number of web-page views for certain product parts, and data-sheet downloads for different products on their website to forecast demand

- ***Optimum Timing of Tasks -*** Tasks, including those related to fab operations, sorting, assembly, and testing are time bound. Since On time deliveries hold the highest weightage in customer retention, this is of utmost importance

- ***Inventory across process steps -*** Chip manufacturing companies hold inventory across all the stages of the supply chain - Raw Materials, Die Bank and Finished goods. If the lead time is very less, finished goods inventory is used. If it is sufficient, chips are manufactured from start, whereas if it is just enough, semi processed chips are used from Die banks

Challenges in the Supply Chain

- ***Complexity -*** Products and steps are highly complex in this industry and hence, it is imperative to have the right forecast at the starting of the planning process. An inaccurate forecast can lead to issues such as fabrication execution delays, capacity constraints, testing execution delays

- ***On Time Deliveries*** - OTDs are of utmost importance as lots of high-end products like cars, mobile phones and other consumer goods are dependent on these semiconductor chips. Delays lead to drop in revenues & blacklisting

- ***RCA is difficult -*** Since, there are many complicated steps involved in the supply chain, pinpointing one reason for delays is difficult

- ***Cycle Time mismatch -*** FE cycle times are much quicker than BE cycle times. This effectively means deferring inventory at different manufacturing periods, which needs additional planning

FIRM ANALYSIS

What does TSMC have that other companies don't?

Local Suppliers- 73% of TSMC's suppliers are from Taiwan or japan which makes transportation easy

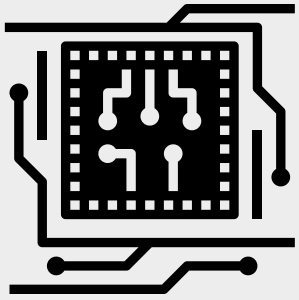
GigaDevice

Qualcomm

FUJITSU

intel

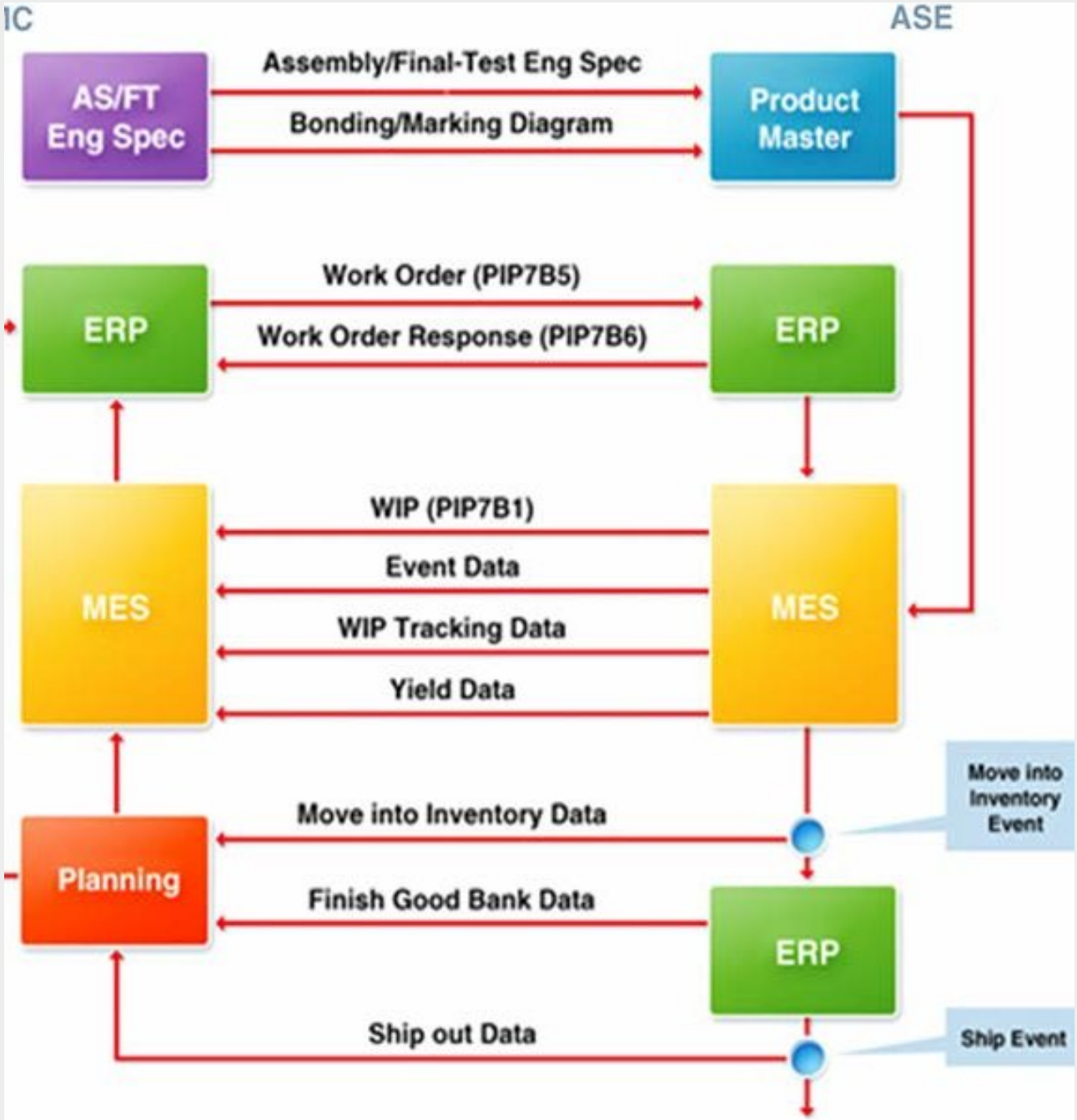
HITACHI



Technology Leadership- TSMC and Samsung are the only foundries that can make 5mm & 7mm node chips

Lean Supply Chain - TSMC's works closely with raw material suppliers to exchange inventory information, so that in-bound supply chain inventories are transparent

TSMC Supply Chain

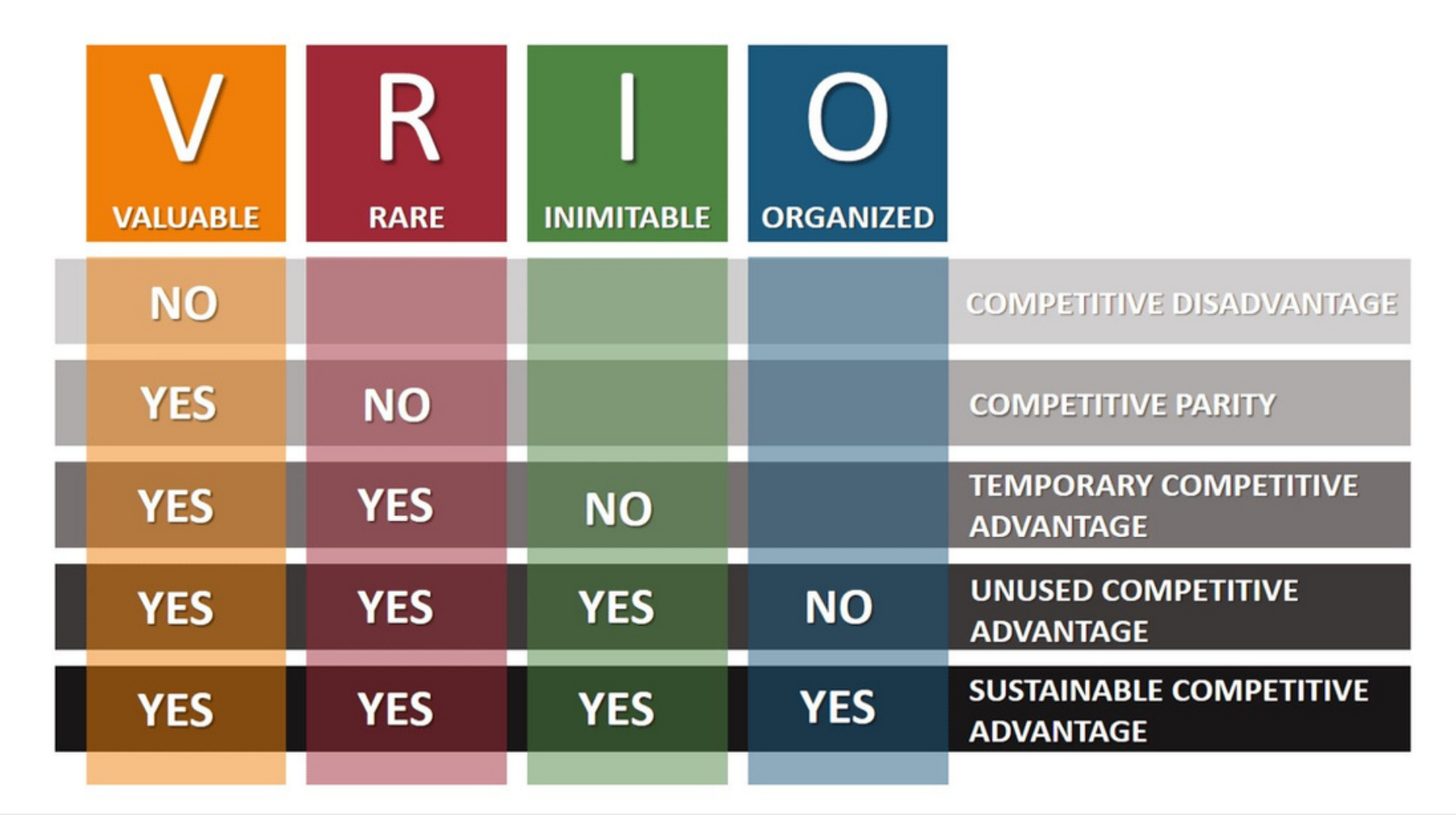


SWOT Analysis

Pestle Analysis

Political	Economical
1. Tightening of trade barriers globally led to losses 2. Government's pledge for nuclear-free Taiwan to create power supply issues	1. Global recession reduced demand for advanced automobiles 2. Declining average selling prices will reduce margins 3. Strengthening of USD reduces demand from countries other than USA
Social	**Technological**
1. Rapid adoption of digital applications in daily life will boost semiconductor industry	1. Miniaturization of chips drives growth 2. High performance computing applications in need of advanced semiconductors 3. 3DFabric technology to increase efficiency
Legal	**Environmental**
1. Strong measure to prevent anti-competitive practices ensure fair market	1. Natural disasters significantly affect the raw material supply

VRIO Analysis



VALUE ADDITION TO OTHER SUPPY CHAINS

The Paint Industry can apply some of the processes followed by chip manufacturing industries

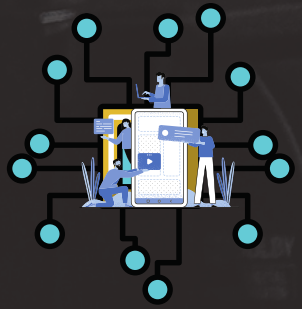
- Keeping inventory at different steps allows to cater to different lead times

- Ordering just enough inventory according to the demand reduces inventory cost

Nov'22

RECOMMENDATIONS

Connected Customer



Digital Development

State of the Art forecasting tools

Smart Inventory Optimisation

Integrated Business Planning

Localised Suppliers

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AUDIO
BARS
CH1 SELECT
CH2 SELECT
INT(L)
INT(R)
INPUT 1
INPUT 2
EVF DTL
ZEBRA
LCD
WFM
CH 1
CH 2
AUTO
MANU
FUNCTION
SHTR/F.RATE
DIAL SEL
DISP/
MODE CHK
89%
P3.2K

THANK YOU