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Market Definitions and Methodology: Semiconductor Foundry Services

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Initiatives: Technology Market Essentials

This document contains the methodology and definitions used in Gartner semiconductor foundry forecasts and market share research.

What You Need to Know

This guide includes market segmentation hierarchy and segment definitions used by our semiconductor foundry analysts in preparing Gartner's Market Share and Forecast reports. Note: Our market share data is worldwide only, but we continue to forecast regional sales.

Introduction

The purpose of this guide is to enable readers of Gartner's semiconductor foundry research to understand the terminology used in our annual semiconductor foundry market share and quarterly forecast publications.

Notable Changes

This update has no changes to any of our definitions pertaining to our market coverage of semiconductor foundry services.

Any modifications to our market share and forecast segmentation and/or definitions are published as "Update" notes for the relevant Market Definitions and Methodology documents in the fourth quarter. Typically, these modifications are then applied in annual Market Share publications, publishing in the second quarter, and subsequent Forecast publications.

Market Methodology

This document describes the methodology and segmentation applied to the semiconductor foundry service market. For Gartner's high-level forecast and market share methodology, see How Gartner Forecasts a Market and How Gartner Estimates Market Share.

For the Market Share and Forecast reports, only recognized revenue in millions of U.S. dollars is reported. For each company, the data reported is consistent with the revenue recognition policies used in the company's public financial reports. We do not attempt to reconcile different revenue recognition policies used by different companies.

Forecast Methodology

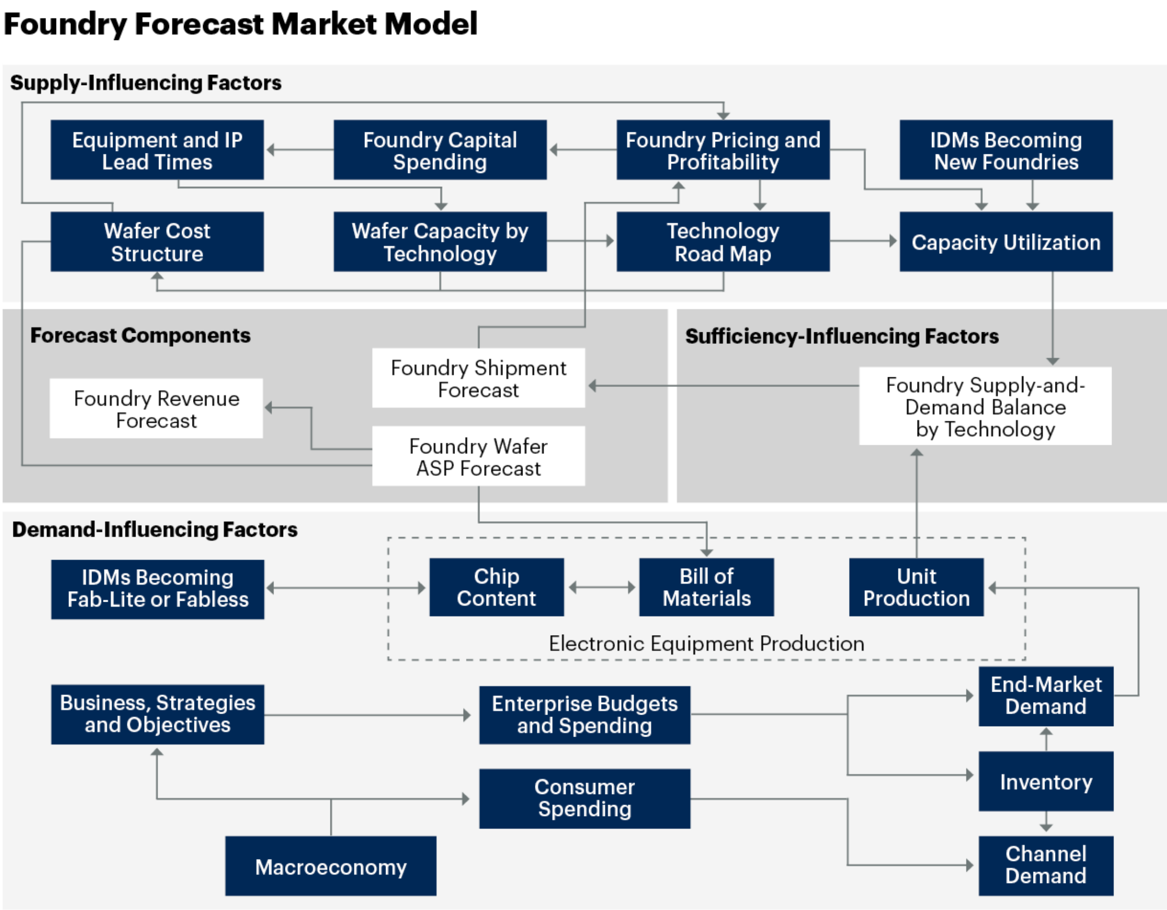
As Figure 1 shows, Gartner's market model for semiconductor foundry services balances two approaches:

1. A top-down trend model analyzes semiconductor foundry service vendor financial reports, guidance and inputs from industry contacts, and semiconductor industry sales data from our semiconductor industry forecast. The top-down model is used as "check and sets" conditions for the roll-up of the bottom-up model.

2. A detailed bottom-up model estimates shipments of all semiconductor wafers by semiconductor foundry service providers.

Note: Gartner does not track semiconductor assembly and test services (SATS) and the outsourced semiconductor assembly and test (OSAT) services as a separate segment. Portions of that market may be included in our coverage if the services are offered/delivered by the semiconductor foundry service providers.

Figure 1: Forecast Market Model for Semiconductor Foundry Services



Source: Gartner
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Our revenue forecast for the semiconductor foundry service market uses the following metrics:

- Foundry wafer shipments in thousands of units
- Foundry wafer average selling price (ASP) in U.S. dollars

Market Share Methodology

Gartner's market statistics methodology combines primary and secondary sources to produce Market Share documents. We first identify major industry participants in the semiconductor foundry service market worldwide with revenue of more than $50 million per year. We survey these participants (in Asia/Pacific, Europe, the Middle East and Africa, Japan, and the Americas) for detailed revenue information about their calendar-year wafer sales for all relevant application segments and for all relevant process nodes. This primary research is supplemented with additional research at a company level to verify market segment participation and revenue totals.

Each survey response is compared with published financial data where available to ensure consistency with audited reports. In cases where a company does not respond to our survey, or is private, or otherwise does not publish financial data, we prepare an estimate of their market participation. Final revenue numbers for each segment are created from the sum total of all survey responses and Gartner estimates at a company level.

Sources of data used by Gartner include, but are not limited to, the following:

- Interviews with manufacturers, distributors and resellers
- Information published by major industry participants
- Estimates made by reliable industry representatives
- Government data or trade association data
- Published product literature and price lists
- Relevant economic data
- Articles in both the general and trade press
- Published company financial reports
- Reports from financial analysts
- End-user surveys

Gartner believes its market statistics data is the most accurate and meaningful available. Despite the care taken in gathering, analyzing and categorizing the data, careful attention must be paid to the definitions and assumptions. Various companies, government agencies and trade associations may use slightly different definitions of product categories or regional groupings, or they may include different companies in their summaries. These differences should be kept in mind when making comparisons between data and numbers provided by Gartner and those provided by other research organizations.

Gartner foundry market share includes only the sale of semiconductor wafers to fabless semiconductor companies. It does not include revenue obtained from the resale of wafers.

Vendor Revenue Profile

Gartner creates and maintains a high-level company model called a Vendor Revenue Profile for each vendor it covers in market share research. Gartner Vendor Revenue Profiles represent Gartner's interpretation of a vendor's revenue mapped to Gartner's technology segmentation. The Vendor Revenue Profile provides a calendar-year view of a vendor's merchant sales (that is, sales to external customers) across technology market segments. Technology segments featured in a Vendor Revenue Profile are not overlapping and are reconciled with the consolidated view of the vendor's public financial statements when available. Clients can access the online version of a Vendor Revenue Profile on gartner.com. For more information on Vendor Revenue Profiles, see Understanding the Gartner Vendor Revenue Profile.

Mergers and Acquisitions

In its vendor market share research, Gartner considers a merger and acquisition (M&A) to have occurred on the first day of the calendar quarter in which the deal was completed (see Table 1).

Table 1: M&A Revenue Allocation Example

(Enlarged table in Appendix)

Revenue Calculation by Quarter ($M)	1Q19	2Q19	3Q19	4Q19	2019	1Q20	2Q20	3Q20	4Q20	2020
Vendor A (Reported Financials)	100	90	110	125	425	110	100	135	150	495
Vendor B (Reported Financials) (Acquired 29 July 2020)	50	40	55	65	210	60	50	20	-	130
Vendor A (Gartner)	100	90	110	125	425	110	100	155	150	515
Vendor A (Gartner)	50	40	55	65	210	60	50	-	-	110

Source: Gartner (June 2022)

Notes: In the example, Vendor A acquires Vendor B on 29 July 2020. Vendor B had third-quarter revenue of $20 million before the acquisition. Gartner's policy is to add Vendor B revenue to Vendor A revenue for the entire third quarter (in this case, $20 million).

Fiscal-Year-to-Calendar-Year Conversion

Gartner publishes market sizing revenue estimates based on the calendar year from January through December of a given year. If a vendor's fiscal year is different from the calendar year, Gartner adjusts the vendor's fiscal year to align with the calendar year.

Exchange Rates

Gartner exchange rates are updated quarterly and used for all Market Share, Forecast and Forecast Analysis documents published in the corresponding cycle. Gartner maintains a database of past and future exchange rates, at the quarterly and annual levels. Historical exchange rates are deduced from appropriate averages of monthly exchange rates reported by the U.S. Federal Reserve (the Fed) and the Pacific Exchange Rate Service. Future rates are applied from exchange rates reported quarterly by our data partner IHS Markit, reviewed by Gartner expertise.

For Market Share reports, historical quarterly and annual exchange rates are applied. For Forecast and Forecast Analysis reports, annual exchange rates combining historical and future periods are applied. Gartner's Market Share and Forecast publications always include the exchange rates associated with the published data.

High-Level Definitions and Segmentation

Market share and forecast details within outsourcing services are segmented by the four major geographic regions: the Americas; Europe, the Middle East and Africa; Japan; and Asia/Pacific. In some instances, there is more detail within Asia/Pacific.

Semiconductor Foundry Services

Semiconductor foundry services, or semiconductor contract manufacturing, are services in which a supplier performs some or all of the semiconductor manufacturing operations under contract to a customer. In its broadest sense, contract manufacturing can encompass wafer fabrication, packaging and assembly, and testing of semiconductor products.

For Gartner research, the definition of a foundry is limited to front-end wafer processing operations and packaging, assembly and testing services that are provided by a foundry supplier as part of a turnkey manufacturing service for which the front-end wafer processing part cannot be separated from the assembly part.

Note: Manufacturing services provided to make semiconductors for the manufacturing company's internal use are not considered as foundry business and are excluded in the report.

Foundry purchase — This can include unprobed wafers, probed wafers, tested wafers, known good die (KGD) or packaged chips, but it must include the front-end wafer fabrication portion of the manufacturing process.

Turnkey foundry services — These are semiconductor contract manufacturing services that include, in addition to basic wafer processing, the subsequent manufacturing operations of packaging and assembly, testing, and drop shipment of finished integrated circuit (IC) products to the end customer or distribution channel. Turnkey services may include some or all of these additional steps.

Dedicated foundry — This is a company whose charter is to fabricate semiconductor products for other companies. Gartner defines a dedicated foundry as one that derives 75% or more of its revenue from the sale of foundry services and has a strategy that relies primarily on the foundry business for future growth.

Integrated device manufacturer (IDM) — This is a semiconductor supplier (merchant or captive) that manufactures its own products. The defining attribute of an IDM is the exclusive ownership and operation of one or more wafer fabrication facilities.

Fabless semiconductor company — This is a merchant semiconductor supplier that designs and markets — but does not manufacture — its own semiconductor products. A fabless company is defined as one that obtains more than 75% of its processed wafers from outside sources.

System original equipment manufacturer (OEM) — This is an electronic equipment supplier that is neither a merchant nor captive semiconductor supplier, but one that designs semiconductor devices for its own internal use and outsources the manufacturing of such devices to a foundry.

Company base — This is the geographical region in which a company is based, determined by the location of the company's headquarters.

Region — Except as defined by "company base," region refers to customer location; that is, the place from which the purchase order originates. Note that this definition differs from the region of shipment in cases in which a foundry is instructed by the customer to ship wafers to another subcontractor for subsequent processing.

Device Segmentation and Features

Foundry segmentation of devices is as follows:

- Memory — DRAM and NAND flash
- Microprocessor
- Logic
- Analog/mixed signal
- Application-specific IC (ASIC)
- Application-specific standard product (ASSP)

- Others (including optical, integrated photonics, wideband gap semiconductors and so forth)

Process geometry features can range from the legacy nodes (0.5 um to 0.13 um) to mature nodes (90 nm to 28 nm) and advanced nodes (14 nm to 3 nm and beyond).

The main users of foundry services are IDMs, fabless semiconductor companies and system OEMs.

Document Revision History

Market Definitions and Methodology: Semiconductor Foundry Services - 18 June 2021

Market Definitions and Methodology: Semiconductor Outsourcing Services - 27 January 2017

Market Definitions and Methodology: Semiconductor Outsourcing Services - 12 January 2016

Market Definitions and Methodology: Semiconductor Outsourcing Services - 8 January 2015

Market Definitions and Methodology: Semiconductor Outsourcing Services - 6 January 2014

Market Definitions and Methodology: Semiconductor Outsourcing Services - 10 January 2013

Market Definitions and Methodology: Semiconductor Outsourcing Services - 17 January 2012

Market Definitions and Methodology: Semiconductor Outsourcing Services - 7 January 2011

Dataquest Guide: Semiconductor Outsourcing Services, Methodology and Definitions, Worldwide - 5 January 2010

Recommended by the Author

Some documents may not be available as part of your current Gartner subscription.

How Gartner Forecasts a Market

How Gartner Estimates Market Share

Market Definitions and Methodology: Semiconductor Wafer Fab Equipment

Market Definitions and Methodology: Semiconductor Devices and Applications

Forecast: Semiconductor Foundry Revenue, Supply and Demand, Worldwide, 1Q22 Update

Forecast Analysis: Semiconductor Foundry Services, Worldwide

Market Share: Semiconductor Foundry, Worldwide, 2021

Semiconductors and Electronics Forecast Database, Worldwide, 1Q22 Update

Semiconductor Inventory Analysis, Worldwide, 1Q22 Update

Table 1: M&A Revenue Allocation Example

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