

167(UK)











- Global Market Outlook
- In-depth analysis of global and regional trends
- Analyze and identify the major plavers in the market. their market share, key developments, etc.
- To understand capability of the major players based on products offered, financials, and strategies.
- Identify disrupting products, companies, and trends.
- To identify opportunities

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Gupta| March 2024

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Infographic

Global Hard Disk Market Overview

Hard Disk Market Size was valued at USD 58.84 Billion in 2023. The Hard Disk market industry is projected to grow from USD 62.43 billion in 2024 to USD 100.26 billion by 2032, exhibiting a compound annual growth rate (CAGR) of 6.10% during the forecast period (2024 - 2032). The Hard Disk Market is expected to grow significantly over the forecast period due to several factors. The growth of the Hard Disk Market is expected to be driven by key factors such as Increased need for storage space, growing demand for SSDS and Growth of the consumer electronics industry to drive the demand. However, factors such as security issues associated with SSDs and development of alternative storage devices/technologies are expected to restrict market growth. On the other hand, Technological advancements and innovations in hard disks and Increased demand in emerging markets pose lucrative opportunities for the Global market.

Figure 1: Hard Disk Market, 2018 - 2032 (USD Billion)



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and
services in
the market.

Comparison of major players financial performance.

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Recommendations

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Source: Secondary Research, Primary Research, MRFR Database, and Analyst Review

Hard Disk Market Opportunity

 Technological Advancements and Innovations In Hard Disks

With the rising need for data storage, the demand for affordable and efficient hard disks has come into sharp focus. There is a growing demand for high-performance hard drives with more storage capacity. Hard disk manufacturers are already investing in research & development to offer best-in-class hard disks to enterprises and individual users. The advent of magnetic and digital technologies in the second half of the 20th century has dramatically changed the hard disk market. Western Digital Corporation is one of the leading players in the hard disk market. The company has been continuously involved in leveraging its advanced technology and Hard Disk Drive (HDD)s to build the most efficient hard disks for its clients. Western Digital Corporation created Opti NAND technology in 2021. An new technology called Opti NAND combines embedded flash drives (EFDs) with HDDs. Higher density of quicker, smarter hard drives are made possible by integration. Opti NAND maintains crucial metadata in the flash drive for speedy indexing and improved data management, and also lowers the frequency of adjacent track interference (ATI) refreshes, which results in latency and performance deterioration.

Furthermore, Opti NAND benefits from the write-cache capability, which allows files to be saved to non-volatile NAND memory to prevent data loss. In the event of a power outage, it keeps data in the write queue. Hard drive technology must always advance to meet the changing demands of industry, academia, government, and science. Cloud computing is becoming more and more popular, and with it, trends like consumerization, workplace mobility, and big data have emerged, creating linked data ecosystems. Hard disc drives and solid-state drives are in higher demand as a result of this. Solid-state drives are becoming more and more popular because of their enormous storage capacity, low power consumption, noise level, and heat production. The increasing technology and innovation in the hard disc industry, such as OptiNAND, UltraSMR Technology, and solid-state drives, are projected to provide growth opportunities for Hard Disk Market players.

Hard Disk Market Segment Insights

Hard Disk Type Insights

Based on type, the Hard Disk Market segmentation includes Hard Disk Drive (HDD), Solid State Drives (SSD)and Hybrid Disk Drives (HHD). The Hard Disk Drive (HDD) segment held the majority share in 2022, contributing around ~51.9% to the market revenue.

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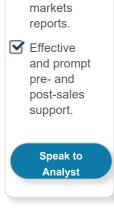


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Prévisions de la taille du marché des disques durs pour 2030 | Rapport sur les parts de marché

Press Release

Increasing Need for Data Storage Facility Among Enterprises to Drive the Global Hard Disk Market:...



Hard disks refer to digital, magnetic, data storage devices capable of storing vast amounts of data such as documents, pictures, music, videos, programs, application preferences, operating systems, and similar other digital content. A hard disk drive is a non-volatile memory hardware device, which permanently stores and retrieves data on a computer. It consists of a platter to which data is written using a magnetic head, all inside an air-sealed casing. Hard drives are used for storing large amounts of data, with typical storage capacities ranging from 1 terabyte to 6 terabytes on single drives. Hard drives, in general, have various points of failure due to multiple moving parts inside the read and write mechanism.

Currently, the hard drive market is facing a decline. The fast adoption of solid-state drives due to the reduced cost of NAND flash and the need for faster read and write speeds to keep up with modern productivity applications have shifted the demand toward faster and more reliable storage options such as HHDs and SSDs.

However, innovations are still being made in the HDD segment. In June 2019, Seagate announced the launch of its HAMR drives, which utilize the heat-assisted magnetic recording process, which, in general, increases the amount of data that can be stored on a drive by temporarily heating the disk material during writing, which makes it much more receptive to magnetic effects and allows writing.

Hard Disk Drive (HDD)

Solid State Drive (HDD)

Solid State Drive (HDD)

W

2022 2032

Figure 2: Hard Disk Market, by Type, 2022 & 2032 (USD Billion)

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Source: Secondary Research, Primary Research, MRFR Database, and Analyst Review

Hard Disk Technology Insights

Based on Technology, the Hard Disk Market segmentation includes Microwave-Assisted Magnetic Recording (MAMR), Heat-Assisted Magnetic Recording (HAMR), Shingled Magnetic Recording (SMR) and Perpendicular Magnetic Recording (PMR). The Perpendicular Magnetic Recording (PMR) segment held the majority share in 2022 contributing around ~85.2% to the market revenue.

Perpendicular magnetic recording (PMR) has the fundamental potential of extremely high bit density recording. Although many efforts have been made for the practical use of PMR, the recording apparatus has still not been manufactured commercially. One of many problems hesitant to make PMR practicable is that a reasonable way has still not become clear to practical use. Moreover there were a lot of unsolved problems peculiar to PMR, such as media noise, head-induced erasure and so on. Lately, the solutions to these technical issues were clarified for the practical use of a perpendicular magnetic hard disk drive.

Heat-assisted magnetic recording (HAMR) increases the storage capacity of HDDs by utilizing a nanoscopic laser diode attached to the read/write head. The laser diode creates and parses smaller data bits that are still magnetically stable. Designers developed HAMR to overcome a fundamental problem with current HDD technology, known as perpendicular magnetic recording (PMR). PMR features spontaneous magnetic polarity flips on data bits positioned very close together. HAMR creates bits on a stable material at room temperature, so the polarity flip is eliminated.

Specifically, Seagate's HAMR technology uses glass-based platters that reach temperatures as high as 752°F (400°C) and heat sinks to further control the heat flow. The nominal endurance of those drives surpasses 3.2 petabytes of data writes per single drive head per year, which is 20 times higher than the minimum industry standards. HAMR allows manufacturers to produce HDDs with data densities ranging between 2 and 5 terabits per square inch (Tbpsi), which is almost three times higher than conventional drives. Seagate has stated that it could manufacture HDDs that achieve densities of 10 Tbpsi by the end of the decade due to advancements in HAMR.

Hard Disk Storage Capacity Insights

Based on the Storage Capacity, the Hard Disk Market segmentation includes Above 1 TB, 500 GB - 1 TB and Less than 500 GB. By Storage Capacity, Above 1 TB segment hold the majority market share in 2022 contributing 78.5% of the market share. Maintaining a high cash flow in the business. The hard drive above 1TB can store a massive amount of data, which is perfect for gamers who have a large gaming library. Not to mention, a 2TB hard drive is also great for storing other types of data, such as music, movies, and photos. If you're looking for a hard drive that can store a large amount of data, then the hard drive above 1 TB is the way to go.

1TB HDD segment is expected to be the dominating segment. HDD manufacturers launch upgraded hard disk drive storage capacity formats every two to three years. Hard disk drives are majorly used in various aspects such as big data management, tiered storage, improved utilization, virtualization, data

classification, high availability, data security, and various data storage-related priorities. Thus, to store huge amounts of data enterprises needs large data storage systems. Therefore, the 500GB - 1TB segment witnessed lucrative growth over the forecasted period.

Hard Disk Substrate Insights

Based on the Substrate, the Hard Disk Market segmentation includes Aluminum and Glass. By Substrate, Aluminum segment hold the majority market share in 2022, contributing 86.3% of the market share. Hard disk drives (HDDs) predominantly use aluminum alloys in the base of the platters as they are non-magnetic, lightweight, can be ground precisely, and are relatively cost-effective. These substrates are widely used in hard disks designed for desktop PCs and servers. The launch of the fifth generation (5G) mobile communication service, the spread of the Internet of Things (IoT), and the development & expansion of digital transformation have led to increased data volumes that require high-end data storage capacity. This has led to rising demand for hard disks for data centers. Asia is the major supplier of aluminum substrates for hard disk platters.

In 1990, Toshiba was the first company to adopt glass substrate in hard disk, and over the years, the other companies have been widely adopting glass substrate for hard disk platters. Glass substrates are thinner, lighter, more rigid, expand less when heated, and can be made flatter. These substrates are used mainly in 2.5-inch hard drives, and during the forecast period, all of the 2.5-inch HDDs for laptops are expected to use glass-based platters. Furthermore, these substrates will witness increased adoption for 3.5-inch hard drives being designed for data centers.

Hard Disk Application Insights

Based on the Application, the Hard Disk Market segmentation includes HDD, SSD and HHD. By application, HDD segment hold the majority market share in 2022, contributing 51% of the market share. Desktops are traditional desk-based computers. Generally, desktop computers use hard drives for primary storage. In recent years, however, the affordability of solid-state storage has made it a viable option for desktop computing requirements. Entry-level SSDs offer up to ten times performance increase over regular hard drives. They are often adopted as a first, with a mechanical hard drive being added later down in the line in current desktop PC builds. The exponential increase in the size of computer applications such as games, which can take up several gigabytes, is encouraging consumers to purchase larger capacity drives. An enterprise HDD (Hard Disk Drive) refers to a type of hard drive designed and optimized for use in enterprise-level environments. These environments typically involve heavy-duty usage, such as data centers, servers, and storage systems where reliability, performance, and durability is crucial. Typically, an enterprise HDD is not used as a standalone hard drive, but as part of a collective unit to operate entire servers with efficiency and regularity. This is not always the case, but it is a consideration when evaluating the worth of an enterprise HDD. They include various safety measures to ensure drives won't fail randomly, hence the price hike compared with consumer HDDs.

Hard Disk End User Insights

Based on the End User, the Hard Disk Market segmentation includes Personal, Business/Commercial and Governmental. By end user, Business/Commercial segment hold the majority market share in 2022, contributing 54.1% of the market share. The commercial use segment is expected to witness significant growth over the forecast period owing to an increase in data stored on corporate networks coupled with the rising adoption of cloud computing services by businesses worldwide. Cloud computing involves storing data online which requires a large amount of hard drive space as compared to non-internet capable applications that store data locally only requiring small amounts of hard drive space at any given point in time.

Local, state, and federal government agencies must store and manage ever-increasing amounts of data, from email and public records to public health databases and video from security cameras. In some cases, they must provide fast data access to employees so they can work or to constituents who need to renew licenses or pay their bills and taxes online. To meet performance requirements and manage data efficiently and cost-effectively, the public sector is increasingly adopting solid state drives (SSDs) due to their improved performance, security and reliability.

With the growth of cloud technologies, which rely on data stored on the cloud, and the growth of streaming services, which serve content through servers, the server segment is expected to witness the highest growth, registering a CAGR of 6.5% over the forecast period.

Hard Disk Regional Insights

By Region, the study provides market insights into North America, Europe, Asia-Pacific, Middle East & Africa, and South America. In terms of revenue, Asia pacific held the largest share of 35.1% in the Hard Disk market in 2022 and is expected to maintain its dominance during the forecast period. Asia-Pacific has been divided into China, Japan, South Korea, rest of Asia-Pacific. The Asia-Pacific region has dominated the renewable energy industry in recent years. The Asia Pacific region has witnessed remarkable economic growth in the last few decades. The emergence of countries like China, South Korea, Taiwan, and India, among others, has drastically altered the structure of the global market in several different industries. The demand for storage solutions

across various sectors, including consumer, enterprise, and industrial, is anticipated to develop over the projected period due to the region's growing adoption of digital technologies.

India and other nations have experienced impressive growth in the IT sector. The India Brand Equity Foundation (IBEF) projects that by 2025, the country's market for business and IT services would be worth USD 19.93 billion. Since the IT sector uses a wide range of devices, including tablets, laptops, and desktop computers, in addition to storage devices like HDDs to store company data, the industry's expansion is anticipated to propel the market during study period.

The Asia Pacific region is witnessing a surge in smartphone subscriptions, which is fostering a favorable market environment for the market growth under investigation. According to the GSMA, smartphone penetration in China is predicted to reach 89% by 2025, with 1.5 billion connections in mainland China.

The demand for consumer electronics is increasing due to a broad consumer base and rising disposable income, which is driving the industry upwards. With smaller and lighter goods, the growing usage of hard disc drives in consumer electronics devices has begun to play a crucial role in the development of new drive technology, encouraging researchers and HDD manufacturers to advance HDD technology. Such trends are expected to support the growth of the studied market during the forecast period.

North America Europe Asia-Pacific Middle East South & Africa America

Figure3: HARD DISK MARKET SIZE BY REGION 2022 & 2032

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Source: Secondary Research, Primary Research, MRFR Database, and Analyst Review

Further, the major countries studied in the market report are the U.S., Canada, Germany, France, the UK, Italy, Spain, China, Japan, India, Australia, South Korea, and Brazil.

Europe comprises of Germany, UK, France, Italy, Spain and rest of the Europe. The number of distributors and resellers of hard disks is growing rapidly in the region. Many of the leading players such as Toshiba, Seagate Technology LLC, and Western Digital Corporation have set up a massive supply chain via distributors and resellers in the region. Along with this, Europe is an attractive region as a data center location. Political stability and new laws governing data security—such as the European Union General Data Protection Regulation—are also helping increase demand for data centers in Europe. The need for various hard disks such as HDDs, SSDs, and HHDs is higher than these data centers and thus boosts the market.

The demand for the hard disk market in the UK is driven by enterprise cloud and software-as-a-service utilities. These include office productivity and file storage, e-commerce, social networking, search, streaming video services, gaming, and mobile apps. The UK is one of the largest markets in Europe for colocation data centers, which has further created growth opportunities for the market. The growing digitalization across the country and the utilization of Internet portals for day-to-day activities have influenced the demand for hard disks. The presence of different leading players such as Seagate Technology LLC and Western Digital Corporation has created a huge growth opportunity for the UK market.

North America is expected to rise significantly throughout the projected period due to increased demand from commercial sectors such as education, healthcare, and research institutes, as well as the government sector, which includes defense and intelligence agencies, among others. Furthermore, solid-state drives (SSDs) are becoming more and more common since they have several advantages over other technologies. For example, SSDs have reduced power consumption and faster performance, making them appropriate for usage in tablets as well as laptops and desktop computers.

The hard drive market in the United States is expanding as a result of digital transformation and the expansion of IoT and cloud technology, which is generating a vast volume of data. In addition, the Switch SuperNAP, the most cutting-edge global data center campus, is the biggest data center in the United States, taking nearly 3.5 million square feet in Nevada. The development of the newest hard disc models is being aided by cutting-edge technologies. These factors play a major role in propelling the US market.

Hard Disk Key Market Players & Competitive Insights

With a strong presence across different verticals and geographies, the Hard Disk market is highly competitive and dominated by established, pure-play vendors. Over 45 vendors cater to this market, and they continually innovate their Hard Disk Drive (HDD)s to meet the evolving needs of businesses by adopting new

technologies to make business more effective. These vendors have a robust geographic footprint and partner ecosystem to cater to diverse customer segments. The Hard Disk market is highly competitive, with many vendors offering similar products and services.

The major players in the market include Western Digital Corporation, Seagate Technology LLC, Toshiba Corporation, Sony Corporation, Transcend Information. Inc., Samsung Electronics, ADATA Technology Co. Ltd., Hewlett Packard Enterprise Company (HP), Apple Inc., Quantum Corp., SK Hynix Inc., Intel Corporation, Lenovo, Micron Technology Inc and Others. Toshiba unveiled its first hard drive featuring flux-control microwave assisted magnetic recording (FC-MAMR) technology, mainly designed for enterprises and nearline applications and Western Digital, after its acquisition with SanDisk, started selling WD Purple Surveillance hard drive with storage of 18 TB. Other companies such as Samsung, Intel, and Sony, along with the manufacturers of HDDs, are constantly improvising the efficiency and performance of the SSDs.

The major players seek to strengthen their global presence through the strategic mergers and acquisitions of local and regional players; they are expected to expand their presence and solutions in those countries during the forecast period. The improvement of the global economic scenario combined with technological advancement in the emerging economies such as Brazil, India, China, and other countries, is likely to fuel the market growth, making it an ideal time to expand the hard disk market geographically and increase the market share. Therefore, vendors must develop new technologies to stay at par with emerging technology trends that could affect the competitiveness of their product lines in the market.

The Hard Disk Market is a consolidated market due to increasing competition, acquisitions, mergers, and other strategic market developments and decisions to improve operational effectiveness.

Key Companies in the Hard Disk market include

- Western Digital Corporation
- Seagate Technology LLC
- Toshiba Corporation
- Sony Corporation
- Transcend Information. Inc.
- Samsung Electronics
- ADATA Technology Co. Ltd.
- Hewlett Packard Enterprise Company (HP)
- · Apple Inc.

- · Quantum Corp.
- SK Hynix Inc.
- Intel Corporation
- · Lenovo,
- · Micron Technology Inc.

Hard Disk Industry Developments

In October 2023, Western Digital will initiate a plan to split its HDD and Flash businesses in order to boost the ability of each division for state-of-the-art technology and product creation. This strategic separation will enable both companies to take advantage of distinct growth opportunities, solidify their leadership positions, and work more effectively through different capital structures.

Last June, Seagate shared insights into the roadmap for Heat Assisted Magnetic Recording (HAMR) technology, revealing details about its first HAMR hard drive with 32TB capacity based on ten disks/ 20 heads.

September 2023: Toshiba Electronic Devices and Storage Corporation introduced its MG10F Series 22TB HDD – a conventional magnetic recording (CMR) HDD that uses Toshiba's helium-sealed design with ten disks. The new MG10F model, with a 22TB capacity, stores 10% more information than Toshiba's previous generation, which had a 20TB volume. Designed for the big data storage demands of their biggest clients, MG10F HDDs are applicable for use cases in a wide range of applications and workloads working at hyperscale as well as traditional data center environments.

Western Digital announced in July 2022 that it had started shipping the new 22TB HDDs targeting three major segments such as IT/data center channel customers, WD Purple Pro for smart video/surveillance, and WD Red Pro for network attached storage (NAS). These drives have OptiNAND innovation; they also apply energy-assisted PMR (ePMR), triple-stage actuator (TSA), and HelioSeal, which help to achieve platter densities up to 2.2 terabytes.

On March twenty-two, Toshiba Electronics Europe GmbH (TEE) hinted that Toshiba Electronic Devices and Storage Corporation had come up with its business expansion plan concerning Nearline Hard Disk Drives (HDDs). This move by the company has been made in order to facilitate further development in HDD technology with a consequent immense growth in storage capacities.

Toshiba has said that it plans to release 30TB+ HDDs by 2025 for the commercial market. These huge capacities have been achieved via two magnetic recording technologies - Heat heatassisted magnetic Recording (HAMR) and microwave-assisted magnetic Recording (MAMR). HAMR heats the disk material using a near-field laser, significantly enhancing writing capabilities. Although there is skepticism around its readiness, quality, reliability, and compatibility, it is fair to note that all leading drive vendors are adopting this tech, with Seagate recently revealing results of an experimental test in which one of its Mozaic 3+ HAMR-equipped drives ran continuously for over 6,000 hours without failure.

Hard Disk Market Segmentation

Hard Disk Type Outlook

- Hard Disk Drive (HDD)
 - SAS HDD
 - PATA HDD
 - 3.5-inch SATA HDD
 - o 2.5-inch SATA HDD
- Solid State Drives (SSD)
- Hybrid Disk Drives (HHD)

Hard Disk Technology Outlook

- Microwave-Assisted Magnetic Recording (MAMR)
- Heat-Assisted Magnetic Recording (HAMR)
- Shingled Magnetic Recording (SMR)
- Perpendicular Magnetic Recording (PMR)

Hard Disk Storage Capacity Outlook

- Above 1 TB
- 500 GB 1 TB
- Less than 500 GB

Hard Disk Application Outlook

- HDD
 - Desktop
 - Enterprise
 - Near Line
 - Others
- SSD
 - Laptop
 - Gaming Consoles
 - Others

- HHD Video Editing Audio Production Others **Hard Disk Substrate Outlook**
 - - Aluminum
 - Glass

Hard Disk End User Outlook

- Personal
- Business/Commercial
- Governmental

Hard Disk Regional Outlook

- North America
 - US
 - Canada
 - Mexico
- Europe
 - Germany
 - UK
 - France
 - Italy
 - Spain
 - o Rest of Europe
- Asia-Pacific
 - China
 - India
 - Japan
 - South Korea
 - Rest of Asia-Pacific
- Middle East & Africa
 - Saudi Arabia
 - UAE
 - South Africa

- Rest of MEA
- South America
- Brazil
 - Argentina
 - Rest of South America

D		
Report Attribute/Metric	Details	
Market Size 2023	USD 58.84 Million	
Market Size 2024	USD 62.43 Million	
Market Size 2032	USD 100.26 Million	
Compound Annual Growth Rate (CAGR)	6.10% (2024-2032)	
Base Year	2023	
Market Forecast Period	2024-2032	
Historical Data	2018- 2022	
Market Forecast Units	Value (USD Million)	
Report Coverage	Revenue Forecast, Market Competitive Landscape, Growth Factors, and Trends	
Segments Covered	Type, Technology, Storage Capacity, Substrate, Application, End User, and Region	
Geographies Covered	Europe, North America, Asia-Pacific, Middle East & Africa, and South America	
Countries Covered	The U.S, Germany, Canada, U.K., Italy, France, Spain, Japan, China, Australia, India, South Korea, Brazil, and others.	
Key Companies Profiled	Western Digital Corporation, Seagate Technology LLC, Toshiba Corporation, Sony Corporation, Transcend Information. Inc., Samsung Electronics, ADATA Technology Co. Ltd., Hewlett Packard	

	Enterprise Company (HP), Apple Inc., Quantum Corp., SK Hynix Inc., Intel Corporation, Mushkin Enhanced, Micron Technology Inc and Others.
Key Market Opportunities	Technological advancements and innovations in hard disks Increased demand in emerging markets Relational analytics using smart SSDs
Key Market Dynamics	Increased need for storage space Growing demand for SSDS Growth of the consumer electronics industry to drive the demand

Hard Disk Companies

Frequently Asked Questions (FAQ):

How much is the Hard Disk market?	\
What is the growth rate of the Hard Disk market?	~
Which region held the largest market share in the Hard Disk market?	~
Who are the key players in the Hard Disk market?	~
Which Type led the Hard Disk market?	\





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