

TMT Sector Overview

Understanding the Space

In an effort to ensure a thorough understanding of the TMT sector, the team has taken a deep dive into the various segments of its coverage universe. This report looks at six major subsectors – Internet, media, telecommunications, software, hardware, and semiconductors. The following are the team's key takeaways:

1. Internet companies earn the majority of their revenues from digital advertising and derive competitive advantages from network effects and business ecosystems.
2. Media firms create, aggregate, and distribute content. Income is realized through licensing revenue, while competitive advantages are derived from a variety of intangible assets.
3. Telecommunications companies are complex, with capital-intensive supply chains. These firms earn revenues from paying subscribers. Given the highly commoditized nature of this space, competitive advantages can result from economies of scale.
4. Software providers earn highly sticky recurring revenues through subscription fees. Technological capabilities, patent portfolios, and human capital all foster competitive advantages.
5. Hardware companies produce consumer and enterprise electronic goods, such as computers and networking equipment. The success of each hardware vertical is highly dependent on the end-users.
6. Semiconductor companies produce integrated circuits and microprocessors that are used in the manufacturing of electronic devices. Competitive advantages are cultivated through scale and in the R&D function through continuous innovation and advancement.

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Table of Contents

Subsector Overviews:	2
Internet	2
Media	2
Telecommunications	3
Software	4
Hardware	5
Semiconductors	5
Portfolio Implications	7
References	8

Subsector Overviews

Internet

Internet companies are some of the most well-known in the TMT coverage universe. Alphabet and Facebook are two of TMT's highest conviction Internet holdings and will be recognizable to most readers. Both companies generate a substantial majority of their revenues through advertising. As their platforms collectively collect huge swaths of data on billions of people across the world, Internet companies are uniquely positioned to serve advertisers. Companies, such as Facebook and Alphabet, collect and analyze data from their users using proprietary algorithms. They then sell this data to advertisers, who can use insights generated from this data to better target desired segments. Common metrics that can be used to understand how well a social media platform is performing include daily active users (DAUs), monthly active users (MAUs), and average revenue per user (ARPU). Search engines can be evaluated on their share of global search queries.

The two greatest competitive advantages for Internet companies are network effects and business ecosystems. Facebook and Alphabet are excellent cases studies for these advantages. Facebook has approximately 1.4 billion DAUs. With such a large and engaged user base, Facebook can offer a vibrant community for users and a major audience for advertisers. Facebook also owns WhatsApp and Instagram, two popular social media and communication services. These platforms can be integrated with the traditional Facebook platform, offering a highly integrated network of the company's products that keep users in the ecosystem. Alphabet has also developed an integrated suite of product and service offerings that incentivize users to stay within the Google ecosystem. The Google search engine, Pixel phone, Google Home smart speaker, Drive productivity suite, and Chrome browser can all be integrated seamlessly, and the more of these products one uses, the more convenient the platform becomes.

The controversy surrounding customer data protections has raised concerns over potentially

restrictive regulations. Facebook's recent incident with Cambridge Analytica highlights how seriously the market, regulators, and users can react to privacy scandals. Investors are concerned that restrictive regulation intended to prevent these incidents would adversely affect the business models of many ad-reliant companies, like Facebook. The Tax Cuts and Jobs Act, which significantly reformed the U.S. tax code will also allow many tech companies to repatriate large sums of offshore cash. This may spark significant capital investments and/or returns of capital to shareholders via repurchase plans and dividends. The TMT team is closely monitoring these trends to assess the impact on our portfolio holdings and watchlist.

Media

Like Internet companies, media companies exist in a challenging and rapidly changing industry. Business models can vary greatly between industry verticals and across firms. At a high-level, media firms create, aggregate, and distribute content, such as news, television programming, movies, books, magazines, video games, and music. The traditional media value chain begins with content creators, people or organizations (e.g. movie studios), who create and own the IP rights to the content that consumers ultimately demand. Once a piece of content has been created, it can be licensed or sold through distributors. Telecom companies deliver content to consumers via cable, Internet, or satellite. Many media companies have pursued vertical integration with distributors, and vice versa. Comcast, which owns NBC, is a good example of a vertically integrated media and telecom company.

Media is a fundamentally creative industry. Companies are rewarded for producing "premium" content – anything consumers are willing to pay a premium for. As a result, intangible assets are a critical source of competitive advantage. Companies such as Disney have accumulated portfolios of invaluable stories and characters that enable them to earn outsized profits over a long period of time. Disney's brand is known as a 'search cost' brand, a brand is valuable because of its ability to act as a signal of quality.

Subsector Overviews

Despite creative talent and intangible assets being a major advantage, scale and barriers to entry also play an important role. The upfront costs associated with producing mass-market media content are enormous. The scale and financial capacity of larger players enable them to produce higher quality content and deliver it to market faster than smaller, worse-equipped competitors.

The Internet has upended the business models of many media companies. Secular trends, such as the decline of print media and the rise of streaming services, are threatening entire industries and market incumbents. The shift from print to digital media and over-the-top (OTT) services are particularly interesting. OTT services, such as Netflix and Spotify, cut out distribution intermediaries in the media value chain. Advances in the speed and reliability of Internet have enabled streaming technology to reduce dependency on media middlemen, such as cable providers. It has also compressed margins for many content creators. This has eroded the ability of many large media players to protect their moats. Despite the disruption facing the industry, there are some positives. Because media is a content-driven industry, those companies which can reliably produce quality content should perform well.

Telecommunications

The telecommunications industry is a complex global network of telephones, mobile phones, internet-linked devices, and complex distribution infrastructure. By operating the systems that enable these devices to communicate and share information, telecom companies provide an essential service for modern life.

Telecom companies serve residential, small business, and large corporate customers, who all pay fees for access to the telecom's network. The price-sensitivity of these customers is largely determined by their size. Residential customers typically have less demanding needs than larger customers and have access to more choice among providers; this allows them to be more price sensitive. The same is often true for small

businesses. Larger companies often require more demanding services, such as high-security private networks and video conferencing. Because these services are so central to the customers' operations, they are willing to pay more.

Telecom is an extremely capital-intensive industry, requiring huge upfront investments and ongoing maintenance expenditures. As a result, scale is the primary competitive advantage for telecom providers. Larger players are able to generate large enough cash flows to absorb the costs associated with the capital investments required to maintain their networks of cables, wires, and towers. Wireless coverage is a metric that measures the percentage of a population covered by a certain network. This can help determine a provider's size and, by extension, its competitive moat. High coverage can also reduce churn, another important industry metric. Churn measures how many customers discontinue their subscriptions; it is a good proxy for customer dissatisfactions. A low churn rate is preferable. Low coverage can be a reason for high customer churn. Two other important metrics to watch for telecoms are subscriber acquisition cost (SAC) and average revenue per user (ARPU). SAC measures the average selling and marketing cost per new subscriber. The spread between these metrics is what ultimately determines a telecom provider's profitability.

There have not been many major shifts in the Canadian telecom landscape. South of the border, the repeal of net neutrality regulations will be a major shift for the industry. Net neutrality mandated that telecom providers give equal treatment (speeds) to all online services. The repeal of the regulation will allow telecom providers to price discriminate against consumers and Internet companies. This will undoubtedly benefit U.S. telecom companies and may pose a threat to certain Internet companies. As interest rates rise, telecoms may become less attractive to certain investors who hold the industry for the dividend yield. The yield may become less attractive relative to bonds given the risks inherent in equities.

Subsector Overviews

Software

At its core, software leverages the computational power of hardware devices to perform tasks that provide value to end-users. The software industry is very broad, spanning from widely used operating systems and productivity software to industry-specific programs. Businesses and governments are the largest end-users in the software market, with 85.2% of industry revenue derived from these customers. TMT currently holds one software company, Microsoft, which specializes in operating systems, productivity software, and cloud services under the Windows, Office and Azure brands, respectively.

Successful software companies often derive their competitive advantage through their technological capabilities, patent portfolios, and human capital. Combined, these factors enable a firm to create products with more functionality, reliability, and ease-of-use than other alternatives to capture market share. In a saturated market, products that can continuously stay at the forefront of their respective field can demand higher prices and avoid pressure from open-source software, referred to as “freeware”. Brand recognition is also critical, as software purchasers look for credible companies with a proven record of accomplishment when making a purchase decision. It is also important to consider the underlying industries served when evaluating specialty software companies, as industry decline or consolidation can hurt profitability.

The most successful software companies develop “sticky customers” that are entrenched in their product offerings. This is often achieved through deep integration with business processes in enterprise software, which creates a reliance on a given product. For example, Enterprise Resource Planning (ERP) software that successfully links parts of a business together is difficult to eliminate or replace with a competing product, as reworking business processes to fill gaps in functionality is difficult and time-consuming. Because of this, customers are unlikely to migrate to competitors after being accustomed to the

software, giving publishers pricing power. Alternatively, software that establishes itself as an “industry-standard” such as Excel, Photoshop, or Autodesk can command a premium, as it is difficult to migrate experienced users to an unfamiliar product. For these reasons, it is important to consider metrics such as market share, user growth, churn rate, and customer satisfaction when evaluating software companies. In addition, traditional metrics, such as cash flow and monthly recurring revenue, should also be factored in. A company with a loyal, growing, and satisfied user base can increase prices gradually to excel financially, whereas sub-par software providers will face challenges as competition increases.

In the past, software companies offered expensive one-time licenses that end users would purchase upfront. Once users’ versions of the software became too antiquated, they would look to purchase a newer edition of the program to update at a substantial cost. Under this model, it was financially prudent for users to utilize dated software as long as possible until security or functionality concerns forced users to update. Now, software companies are rapidly transitioning to subscription models referred to as Software-as-a-Service (SaaS), where software is licensed on a per-user, per-month basis.

This shift has allowed for software companies to generate stable recurring revenue while giving clients the flexibility to add or remove functionality to meet their needs in real time. With 38% of enterprise software buyers migrating or planning to migrate towards subscription-based solutions, software companies that can effectively bundle and price their products have the potential to achieve significant long-term revenue growth. At the same time, this shift may create short-term revenue turbulence as buyers transition away from large immediate purchases in favor of an ongoing subscription.

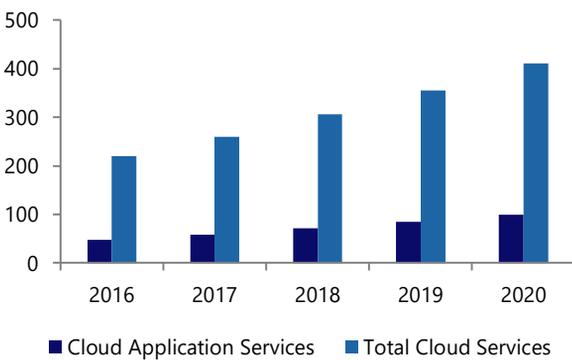
In recent years, investors have placed an increased focus on recurring revenue, valuing it at higher multiples than traditional non-recurring revenue.

Subsector Overviews

SaaS companies are often valued by multiplying their annual or monthly recurring revenue by a multiple that is a function of user growth, total addressable market, revenue retention, gross margin, and customer acquisition costs.

EXHIBIT I

Cloud Services Global Revenue Forecast (\$B)



Source(s): Gartner

Hardware

Hardware companies produce consumer and enterprise electronic goods, such as computers and networking equipment. These products are then sold domestically and internationally, either through an intermediary retailer or directly to end-users. Hardware manufacturers can sell branded products to end-users or can serve as an Original Equipment Manufacturer that produces parts that are marketed by another manufacturer. The industry is fast-paced and highly competitive, with many commoditized subsectors.

To compete, hardware companies require strong supplier relations and tight cost control. Low costs and economies of scale often serve as a sustainable competitive advantage in the industry. However, even companies that possess these traits often struggle to achieve abnormal growth, as the undifferentiated products they produce face immense price competition. Truly successful companies in the space, such as Apple or Oculus, rely on a strong brand that

can command a premium over other devices. In addition, successful hardware companies strategically incorporate complementary goods, such as warranty plans, implementation support, and accessories, into their offerings to drive supplementary revenue and increase margins. Ultimately, companies that can establish themselves as a differentiated brand or that can use their core hardware business as a platform to sell more lucrative goods and services are able to thrive in the industry. When evaluating a hardware company, brand recognition and perception should be carefully considered in tandem with margins and margin growth. The sources of revenue should also be examined for signs of successful diversification.

In the past, individual companies would buy and maintain an arsenal of servers to support their digital systems. With the rise of cloud computing, companies are reducing the number of servers they maintain in favour of scalable, on-demand cloud solutions from players such as Amazon and Microsoft. This trend will shift the customer base of hardware companies profoundly; rather than serving a fragmented base of end-users, demand for hardware will slowly concentrate among larger server hosts. These clients will likely be able to exercise considerable bargaining power over hardware companies, further reducing margins. Fortunately, demand for server power is expected to increase rapidly over the upcoming years, which will help offset the stagnant growth of traditional hardware markets.

Semiconductors

Semiconductor companies produce integrated circuits and microprocessors that are used in the manufacturing of electronic devices. Through a complex production process, silicon wafers are transformed into semiconductors that are sold to manufacturers in the telecommunication, electronic, and appliance space. Companies are broken down into integrated providers, such as Intel, as well as "fabless" providers, such as Qualcomm and Nvidia, that design semiconductors but outsource manufacturing to foundries.

Subsector Overviews

To create a lasting competitive advantage, companies must remain at the forefront of technological advances and continuously create leading-edge products. Intel, for example, used its position as the uncontested performance leader in desktop central processing units to command a significant price premium. As a result, the company maintains generous gross margins – nearly double that of competitor AMD.

Research and development spending often serves as a proxy for performance, but a thorough investigation of a company's product portfolio is required to truly assess performance. It is possible for companies to succeed in the production of low-end products, through tight cost-control and strategic supplier relations, albeit more challenging than targeting the high-end market.

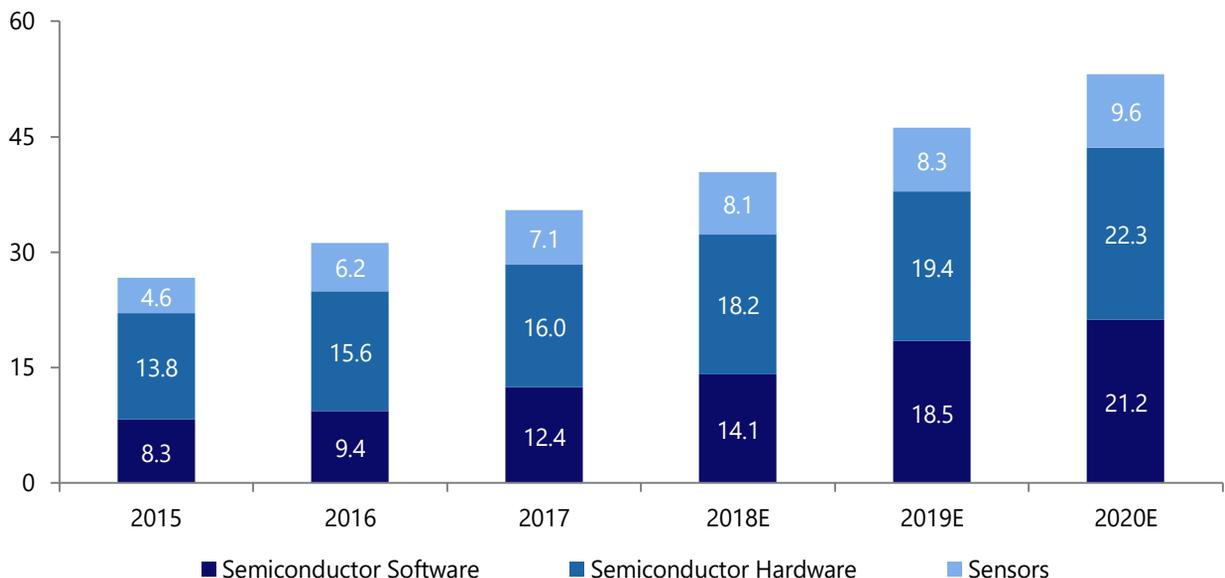
The growth of the Internet of Things (IoT) segment will be a catalyst for semiconductor demand in the upcoming years. As everyday consumer products and

industrial equipment are equipped with electronics and sensors, semiconductors will be required to power these devices. While the computational power required in these devices will likely not be large, devices will require networking abilities to communicate with other devices. Therefore, while the industry as a whole will benefit from this trend, companies that excel in wireless network technology stand to realize the largest upside.

Other large verticals, such as the automotive industry, are also propelling semiconductor growth. The average car today has between twenty-five to fifty central processing units, a number that is expected to further increase as self-driving technology becomes mainstream. The automotive semiconductor market is forecasted to grow at a 19.9% CAGR to reach over \$102B by 2022. In addition, growth in cloud computing and artificial intelligence will create demand for computational power and drive semiconductor growth.

EXHIBIT II

Global Semiconductor Market Projections (\$B)



Source: Business Insider

Portfolio Implications

Given the conclusions drawn in the Subsector Overviews, the TMT team has segmented the business models in its coverage universe into three categories: favorable, neutral and discretionary, and unfavorable.

Favorable

Both the software and Internet subsegments within the TMT coverage universe are of particular interest moving forward. The team feels strongly that both are poised to derive the most value given their strong business models, as well as their positioning in the sector. Since most software companies operate using subscription-based models, this provides them with recurring and typically highly-sticky income. The team is bullish on the Internet space in the long-run and neutral in the immediate future. Given the success of Internet names is tied closely with the macro conditions, such as the current regulatory environment, the team wants to take a deep-dive into these conditions before making a call. However, in the long-term, our position remains bullish.

Neutral and Discretionary

This category refers to subsegments the team is either neutral on or feels we need to evaluate on a case-by-case basis. The team has allocated semiconductor and hardware companies to this segment. Semiconductor companies, while leveraging lucrative business models,

are difficult to evaluate. The space requires deep-rooted technical knowledge to understand the products and services, which the TMT team hopes to acquire throughout the year. As a result, we will examine each company individually, as opposed to taking a subsector-wide approach. Similarly, the product portfolios of hardware companies are extremely broad. Hardware can range from security cameras to desktop shells, and as a result, the team has characterized it as a discretionary subsegment.

Unfavorable

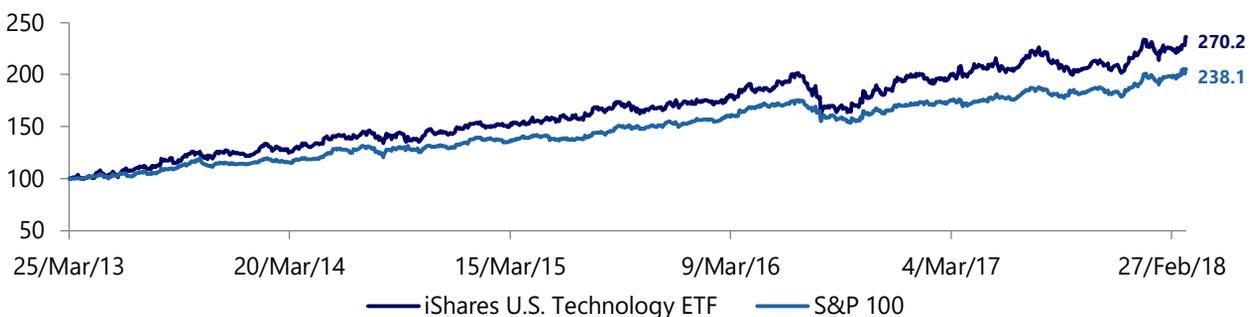
Both the telecommunications and media subsegments within the TMT coverage universe are anticipated to underperform. The team believes that rising interest rates paired with near-max payout ratios will force many yield-seeking investors to cycle out of telecom, allocating capital to higher-yield credit securities. OTT services are expected to continue disrupting the media landscape, further compressing margins and the competitive advantages of traditional incumbents.

Implementation

The team will place emphasis on researching companies in the software and Internet space, particularly in the Canadian portfolio. An unfavorable outlook on telecom may lead the team to reconsider its significant exposure to telecoms Bell and Telus.

EXHIBIT III

Historical U.S. Technology Relative Performance



Source: S&P Capital IQ

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