



Medtronic PLC		
Consensus Rating	▲	3.84
Buys	48.4%	15
Holds	45.2%	14
Sells	6.5%	2

Thomas Parker
Applied Portfolio Management

Medtronic

A NEW VALUE FOR VALUE INVESTORS
RUTGERS BUSINESS SCHOOL | SPRING 2023



Executive Summary

Medtronic is a company started in a garage as an electrical repair shop in the late 1940's, growing to become the largest medtech company in the world in 2017, with revenues of \$29.7 billion. It operates in a fast growing industry and is extremely well-positioned to take full advantage. The heart of the company's strategy is to grow its market share by meeting unmet demand in cutting edge medical devices through a dual strategy of acquiring valuable companies and advancing the field of surgical and medical device technology through research & development (R&D).

Analysts are evenly split between buy and hold, so the case for Medtronic isn't an easy layup. In this paper I will talk about some of the company's achievements, the environment in which it operates, and I will analyze the company's financial situation from the perspective of value investing.

Some of the more notable items uncovered:

- Medtronic was in the unenviable position of integrating a company of its own size acquired in a \$40 billion dollar deal just as the COVID-19 pandemic hit all countries of the globe. The company may be starting to find its footing again
- However, as a result, MDT's stock has recently been trading at 2014 prices. Opportunity?
- Thanks to its intangible assets, the company enjoys a wide moat, and strategies such as pivoting towards a Value Based Procurement (VBP) business model and inorganic growth strategies such as "pruning" the most unprofitable parts of the business are likely to pay off
- While some of the company's financial ratios track with the philosophy of value investors in the tradition of Warren Buffett, others are right on the line. For example, the company's current P/E ratio is around 25, but its forward P/E ratio is just above 15. Similarly, investors looking for positive exposure to the value factor seek out companies with current assets above 2x current liabilities. Medtronic is right on the borderline, with current assets of \$23,059 m and current liabilities of \$12,394 m as of fiscal year end 2022
- While competition amongst global multinationals is fierce, barriers to entry are extremely high and the ability for buyers like hospitals and governments around the world to control price is increasing, but the unique nature of the company's portfolio is a notable source of strength
- There is a wide array of trends within the MedTech industry today, as well as risks such as portfolio exposure in large countries experiencing increases in the use of governmental price control mechanisms, particularly in both the US and in China

Recommendation	BUY
Price Target	\$116.26
Ticker	MDT
Sector	Healthcare
Industry	Medical Devices

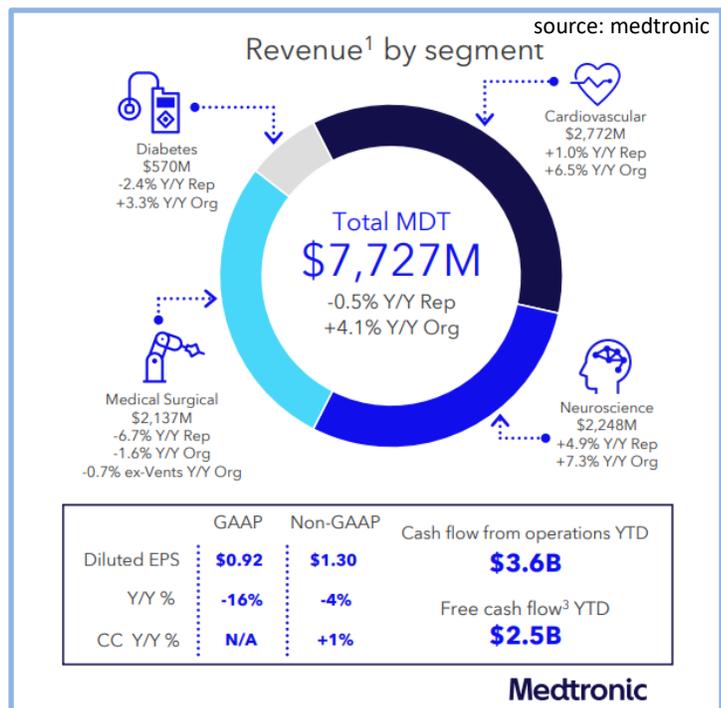
Key Data Points

Average Trading Volume	6.1 Mil
Current Price	90.06
Number of Employees	95,000
52-Week Range	\$75.77-\$114.31
Forward Dividend (Yield)	3.05%
Current P/E	26.0
Forward P/E	15.11
Debt/Equity	0.55
Current Ratio	1.76
ROA	5.56%
ROE	9.60%
ROIC	5.72%
Gross Margin	67.99%
Operating Margin	18.16%
Profit Margin	13.21%
Market Cap	112.91 Bil
Enterprise Value	129.90 Bil



Company Profile

Medtronic was founded in 1949 by Earl Bakken and his brother-in-law Palmer Hermundslie. What began as an electrical repair shop in a garage in Minneapolis would by 2017 rank as the largest surgical and medical technology company in the world. Today, the medical device manufacturer and services provider operates in over 150 countries and employs over 95,000 people. Medtronic earned over \$31 billion in revenue during fiscal year 2022, an increase of 5.2% over FY2021; the Specialty Therapies division in the neuroscience portfolio grew 12% year-over-year, while the Surgical Innovations division within the Medical Surgical segment grew at 11% YOY, earning \$6 billion in revenue for FY2022. Its net profit margin of 15.9% for FY2022 was a 32.8% increase over FY2021. During its most recent quarter, the company beat earnings expectations by bringing in \$7.72 billion, an expansion of 1.9% over the prior quarter's results.¹ It develops, designs, sells, and markets a wide range of highly specialized devices across four separately-operated divisions, and its most well-known brands include BioGlide, autoLog, CapSure, Cardioblade, Keracel, LandarkX, Kappa 900, and many more.^{2a} Being well known to Minnesotans, the state of its previous longtime headquarters, in 2015 the company acquired the Irish global healthcare products and medical device/supply company Covidian and shifted headquarters to Dublin, Ireland. The main purchaser of its products is hospitals; other customers include clinics, 3rd party healthcare providers, distributors, and institutions such as group purchasing organizations (GPOs) and government healthcare programs. Medtronic enjoys a wide moat, primarily consisting of the company's intangible assets such as intellectual property (patents). In addition, as I will explore in my interview with Medtronic Principal Product Manager Dominic Isolda, also extremely valuable are the company's medical device sales reps who are relied upon by doctors to play the role of "specialized experts"³ at every step of the way. Across all four of the company's segments, its products are known for the highest quality, but as more top multinational competitors begin to expand their own portfolios and price becomes a greater issue in the presence of a slowly but steadily increasing number of substitutes, the company must continue its appreciable investment in R&D and M&A while ensuring that continued acquisitions do not negatively impact growth or profitability (and profitability ratios such as return on invested capital (ROIC)).



³ The company's products address some of the world's most formidable chronic diseases, including cardiac rhythm conditions, cardiovascular diseases, spinal conditions and musculoskeletal trauma, ear, nose, and throat conditions, dental, cranial and oral maxillofacial conditions, neurological conditions, urological and digestive conditions, as well as diabetes



Medtronic's Business Portfolios

“Engineering the extraordinary”

As part of an overall transformation intended to make the company more agile, Medtronic now operates its four distinct strategic business segments as separate entities. Resources that are allocated to each individual business segment are decided upon my management based on “net sales and operating profit.” The company defines operating profit as “representing income before taxes and excluding a few additional expenses and costs.”^b In 2018, Medtronic’s various portfolios of products was described as “unmatched.”^c

Medtronic offers products across four separate operating business segments: the Cardiovascular Portfolio, the Medical Surgical Portfolio, the Neuroscience Portfolio, and the Diabetes Operating Unit.

source: Barron’s

Cardiovascular Portfolio^d

As this division was where Medtronic began with the original implantable pacemaker device, this business division deserves a special place among Medtronic’s overall product and service portfolio. Of note, On May 1, 2023, the FDA approved MDT’s miniaturized, leadless Micra AV2 and Micra VR2 pacing systems.⁴ the The products and services of the cardiovascular portfolio are intended for the “diagnosis, treatment, and management of cardiac rhythm disorders and cardiovascular disease, as well as services to diagnose, treat, and manage heart and vascular-related disorders and diseases.” Users of these products and therapies include medical specialists, including electrophysiologists, implanting cardiologists, heart failure specialists, cardiovascular, cardiothoracic, and vascular surgeons, and interventional cardiologists and radiologists. This portfolio consists of the three divisions of Cardiac Rhythm & Heart Failure, Structural Heart & Aortic, and Coronary & Peripheral Vascular.



^b Interest expense, amortization of intangible assets, centralized distribution costs, non-operating income or expense items, restructuring and associated costs, acquisition-related items, impairment charges (corporate charge), MCS impairment / costs, IPR&D charges (corporate charge), exist of businesses, debt tender premium and other charges (corporate charge), medical device regulations, and contribution to Medtronic Foundation (source: 2022 10-K)

^c <https://www.morningstar.com/articles/859449/medtronics-portfolio-is-unmatched>

^d See Note 1 in the appendix for more information on the business units of this division.



Cardiovascular*								
Key Financial Information					Net Sales by Market Geography			
Year	Net Sales	Operating Profit	Total Assets	Depreciation Expense	Non-U.S.			
					U.S.	Developed Markets	Emerging Markets	
Q1 2023	2,772	1,034	NA	NA	1,375	859	538	
2022	11,423	4,512	14,490	214	5,545	3,866	2,012	
2021	10,773	3,850	15,072	212	5,248	3,752	1,773	
2020	10,468	3,719	14,844	210	5,062	3,519	1,887	
2019	11,505	4,532	15,453	194	5,750	3,767	1,988	
2018	11,354	4,461	15,407	183	5,681	3,790	1,883	
2017	10,498	4,134	15,192	180	5,454	3,939	1,651	

Fig. 1

*All numbers in mm

These operating units develop, sell, and maintain products intended to help patients with heart rhythm disorders and heart failure.

Medical Surgical Portfolio^e

Source: lippincott.com/work/medtronic

The primary products and services belonging to Medtronic’s Medical Surgical Portfolio are aimed at diseases of the respiratory system, gastrointestinal tract, renal system, lungs, pelvic region, kidneys, obesity, as well as other complications. In a specific sense, users of the products and therapies associated with this portfolio are typically surgeons. More broadly, users of the products and therapies developed, manufactured, and marketed by this segment include healthcare systems, physicians' offices, ambulatory care centers and other alternate site healthcare professionals, as well as sometimes being used directly at the patient’s home. This business segment is branched into two divisions: Surgical Innovations, and Respiratory, Gastrointestinal, & Renal.^f



Medical Surgical*								
Key Financial Information					Net Sales by Market Geography			
Year	Net Sales	Operating Profit	Total Assets	Depreciation Expense	Non-U.S.			
					U.S.	Developed Markets	Emerging Markets	
Q1 2023	2,137	748	NA	NA	965	760	412	
2022	9,141	3,572	36,490	200	3,862	3,373	1,905	
2021	8,737	3,021	39,319	195	3,650	3,320	1,766	
2020	8,352	3,044	39,666	194	3,532	3,169	1,651	
2019	8,478	3,262	41,186	206	3,630	3,250	1,598	
2018	8,716	3,346	43,002	217	3,804	3,378	1,534	
2017	9,919	3,434	49,249	358	5,049	3,479	1,391	

*All numbers in mm

Fig. 2

^e See Note 2 in the appendix for more information on this division.

^f The Respiratory, Gastrointestinal, & Renal division will be spun-off during FY2024, as described below.



Neuroscience Portfolio^g

The primary products and services from which the Neuroscience Portfolio segment derives its revenues include those focused on neurostimulation therapies and drug delivery systems for the treatment of chronic pain, as well as various areas of the spine and brain, along with pelvic health and conditions of the ear, nose, and throat (2022 10-K). Users of products and therapies: Specialists, including spinal surgeons, neurosurgeons, neurologists, pain management specialists, anesthesiologists, orthopedic surgeons, urologists, urogynecologists, interventional radiologists, and ear, nose, and throat specialists.

This segment is separated into three divisions: the Cranial & Spinal Technologies Operating Unit, Specialty Therapies, and the Neuromodulation Operating Unit.

Neuroscience*								
Key Financial Information					Net Sales by Market Geography			
Year	Net Sales	Operating Profit	Total Assets	Depreciation Expense	Non-U.S.			
					U.S.	Developed Markets	Emerging Markets	
Q1 2023	2,248	897	NA	NA	1,507	401	341	
2022	8,784	3,765	16,917	265	5,753	1,801	1,229	
2021	8,195	3,162	17,151	236	5,456	1,019	1,015	
2020	7,725	2,915	16,850	233	5,122	1,659	945	
2019	8,183	3,319	16,825	217	5,478	1,759	946	
2018	7,743	3,058	15,245	146	5,164	1,720	859	
2017	7,366	2,868	15,441	167	5,012	1,588	766	

*All numbers in mm

Fig. 3

Diabetes Division/Operating Unit^h

The principal product and service offerings the Diabetes Operating Unit provides to its clientele are encapsulated within the area of diabetes management. The business unit works to expand the therapeutic options available to

Diabetes*								
Key Financial Information					Net Sales by Market Geography			
Year	Net Sales	Operating Profit	Total Assets	Depreciation Expense	Non-U.S.			
					U.S.	Developed Markets	Emerging Markets	
Q1 2023	570	106	NA	NA	215	274	80	
2022	2,338	583	3,797	67	974	1,085	279	
2021	2,413	598	3,671	53	1,171	1,019	222	
2020	2,368	546	3,165	38	1,204	940	224	
2019	2,391	739	3,095	34	1,336	855	200	
2018	2,140	634	2,900	29	1,226	739	175	
2017	1,927	690	2,641	29	1,148	625	154	

*All numbers in mm

Fig. 4

patients diagnosed with Type-1 and Type-2 diabetes, while existing products align with the central importance of strict glucose monitoring and control instruments. This product portfolio includes insulin pumps (MiniMed 770G system, MiniMed 780G system), continuous glucose monitoring systems

^g See Note 3 in the appendix for more information on the operating units of this division.

^h See Note 4 in the appendix for more information on the diabetes division/operating unit



(Guardian Connect), smart insulin pens (InPen), and insulin pump consumables (Extended Infusion Set). Medtronic considers the users of those products and services offered by this operating unit to primarily be endocrinologists and primary care physicians (PCPs).

Today, almost 10% of the adult population in the United States is living with diabetes, and based on current estimates this trend is expected to continue, doubling by 2040. Importantly for Medtronic, as I discuss in my interview with Medtronic Product Manager Dominic Isolda, not only did the company just get the good news that an FDA warning letter was being lifted, but the company’s MiniMed 780G insulin pump was just approved for use in the United States by the FDA.

Best and Worst Performers of FY2022

Fig. 5

The table below includes net sales by segment and division for fiscal years 2022 and 2021:

(in millions)	Net Sales by Fiscal Year		Percent Change
	2022	2021	
Cardiac Rhythm & Heart Failure	\$ 5,908	\$ 5,584	6 %
Structural Heart & Aortic	3,055	2,834	8
Coronary & Peripheral Vascular	2,460	2,354	5
Cardiovascular	11,423	10,772	6
Surgical Innovations	6,060	5,438	11
Respiratory, Gastrointestinal, & Renal	3,081	3,298	(7)
Medical Surgical	9,141	8,737	5
Cranial & Spinal Technologies	4,456	4,288	4
Specialty Therapies	2,592	2,307	12
Neuromodulation	1,735	1,601	8
Neuroscience	8,784	8,195	7
Diabetes	2,338	2,413	(3)
Total	\$ 31,686	\$ 30,117	5 %

The two fastest growing segments are the surgical innovations division (comprised of the recently-consolidated surgical robotics and surgical innovations business units) of the Medical Surgical portfolio and the specialty therapies business unit of the Neuroscience portfolio. The diabetes division/business unit, which recently received some good news in both a MiniMed 780G FDA approval and an FDA warning letter lift, was the second worst performer, with the Respiratory, Gastrointestinal, & Renal unit earning YOY revenues 7% lower than FY2021.

Supply Chain

The medical device industry value chain can be separated into four parts: raw materials, component production, medical device manufacturers, and healthcare providers (mainly hospitals). Aside from labor,



raw materials consists of metals, oil, rubber, silicon, and textiles, while component production includes batteries, cables/wires, plastics, composites, chipsets, and glass. Global petrochemical giants such as Shell and BP and large metals and mining companies are the primary producers for raw materials, while the specialized approach necessary for component production means that both large and small companies alike are involved in this stage. However, small companies must have the ability to fulfill contracts requiring large volumes.⁵ As discussed below, sustainability is becoming increasingly important to companies like Medtronic, so supply chain transparency is gaining in importance. According to Bloomberg, Medtronic has 100 suppliers, including Plexus Corp, IntriCon Corp, Dassault Systemes SE, Celestica Inc., Benchmark Electronics, LISI, TTM Technologies, Vishay Intertechnologies, Microchip Technologies, Berry Global Group, Surmodics Inc., Varex Imaging Corporation, Sinbon Electronics, and COSMO Pharmaceuticals. Supply chain disruptions during the pandemic greatly impacted Medtronic's profitability especially during 2020, and while revenues picked up as 2020-era interruptions continue to normalize, one Bloomberg Intelligence analyst writes "supply-chain headwinds" are likely to result in reductions in FY2023 free cash flow generation compared to FY2022.⁶

Management

Source: medtechinsight

One of the questions Michael Shearn's book *The Investment Checklist* urges investors to ask themselves when assessing the quality of a company and its management is "Can you identify a moment of integrity for the manager?"⁷

An example of how an investor in Medtronic might answer this answer may be found in a June 2021 interview Twin Cities Business journalist Liz Fedor conducted with the then relatively new CEO of Medtronic, Geoff Martha. During their interview Fedor mentioned to Martha she recalled he had "brought up



the importance of humility" three times when he spoke at a Medical Alley virtual meeting earlier that year, an event that was focused on diversity, equity, and inclusion. Martha answered "I don't really like arrogance. In high-performing people who don't display a level of humility, we've moved them out of [Medtronic]. People don't like to work with arrogant people."⁸ While I personally find this to be something akin to a moment of integrity (of course, it's a comment on previous public statements given during an on-record interview), I also think this answer may provide investors some amount of insight into other questions Shearn advises investors to consider. Such questions include "What type of manager



is leading the company?”, “Does the management team know how to hire well?”, “Does the management value its employees?”, and “Does the CEO love the money or the business?” In my interview with Rutgers Business School alumnus and Medtronic Principal Product Manager Dominic Isolda featured below, he shared some thoughts on why he believes Medtronic has become such an important and positive force, and I think he provides additional insight into questions that investors may ponder when considering a long-term investment in a company.



Source: [massdevice.com](https://www.massdevice.com)

CEO Geoff Martha

Martha announced the company’s new strategic transformation during Medtronic’s 2020 biennial investor day, described in greater detail in the following section. While doing so, he acknowledged that the company had for too long been growing “below its markets” and that its performance at that time was “not commensurate with our technology leadership.” Many investors have been shaking their heads at Medtronic’s performance since it acquired Covidien in 2015 for over \$40 billion and moved its headquarters from Minneapolis, diabetes division/operating unit, the more important point is that Martha’s announcement during that 2020 biennial investor day didn’t just win him a few fans for his acknowledgement of the gorilla in the room, I think it might be looked back upon as the time when Medtronic turned things around. In other words, that may have been the moment when Medtronic’s stock became appreciatively underpriced. As Charlie Munger once said, “if you tell people why, they’re more likely to comply.”⁹



Operations & Quality



Greg Smith
EVP, Global Operations & Supply Chain
Previous: Walmart & Goodyear



Scott Cundy
SVP, Chief Quality Officer
Previous: Danaher, Medtronic



Ken Verhulst
SVP, Global Manufacturing
Previous: Keurig Dr. Pepper, GE, Ingersoll Rand



Valerie Finarty
VP, Ops Transformation
Previous: GE Healthcare, Hill-Rom

Businesses



Harry 'Skip' Kil
President, Cranial & Spinal Technologies
Previous: Smith & Nephew, NuVasive



Que Dallara
EVP, President of Diabetes
Previous: CEO of Honeywell Connected Enterprise



Mike Marinaro
President, Surgical Robotics
Previous: Medtronic - Cardiac Rhythm Management



Dr. Kweli Thompson
President, Cardiac Rhythm Management
Previous: Medtronic - Cardiac Resynchronization and Defib.

Functions



Bob Hopkins
Head of Global Strategy
Previous: Bank of America Merrill Lynch



Mei Jiang
Head of Global Digital Innovation
Previous: Iron Mountain, HP, Cisco



Rashmi Kumar
SVP, Chief Information Officer
Previous: Hewlett Packard Enterprise, McKesson



Gary Corona
SVP, Global Financial Planning and Analysis
Previous: General Mills

Source: medtronic.com

Growth Strategy

During the company’s virtual Investor Day 2020, which would have been just after the height of the pandemic with investor returns at a low, CEO Geoff Martha and others in management presented the company’s new far-reaching strategic growth agenda. This was Martha’s first such communication to investors since assuming leadership in August of that year, and it is not difficult to imagine this new agenda had been his top priority since day one.

The strategy pinpointed five individual drivers of sustainable revenue growth acceleration: 1) going on the offensive and taking share; 2) creating and disrupting big markets with significant growth potential; 3) putting the “tech” in medtech; 4) investing in innovation and allocating capital to large and promising growth opportunities—both organically and inorganically, and; 5) empowering its operating units to become more nimble and competitive.¹⁰

Inorganic Growth

During the 2010s, mergers and acquisitions in the MedTech space were happening at an intensity never before seen. As further illustrated in the company timeline found in the appendix, Medtronic has bolstered its wide moat in part thanks to some of these deals. In 2014 Medtronic acquired N.G.C. Medical in a deal worth \$350 million, in the year prior the company bought Minnesota-based Cardiocom



for \$200 million, enabling a greater focus on healthcare at the home setting. While in 2015 the MedTech heavyweight would continue implementing an inorganic growth strategy alongside its normal business operations, buying Sophono (undisclosed), Medina Medical (\$150m), and Aircraft Medical (a deal worth \$110m, granting Medtronic ownership of the OsteoCool RF Ablation System from Baylis Medical). However, one of Medtronic’s most important milestones was the 2015 acquisition of Covidien, a global health tech and medical supplies provider out of Ireland – a company roughly the same size as Medtronic.¹¹ The purchase, funded by notes, enabled the company to greatly expand its global reach, bringing their groundbreaking scientific achievements to millions more. The acquisition improved Medtronic’s marketplace positioning vis-à-vis Johnson & Johnson’s medical device segment (DePuy Synthes, Ethicon, and Biosense Webster, among others), boosting revenues by over \$7 billion alone during the first quarter the deal closed and resulting in an effective tax rate of -18.5% in 2020.¹² The Covidien deal was structured as a tax inversion, which significantly improved the company’s tax liabilities.¹³ In response, the company has committed itself to investing \$10 billion in additional R&D and innovation expenditures above and beyond research and development spending already planned by both Covidien and Medtronic.¹⁴

However, the \$40 billion acquisition has not been without growth pains. Value investors are primarily engaged in fundamental analysis, analyzing performance by looking at a list of various factors such as market trends, macro headwinds, and company fundamentals. They are skeptical of the strong form of the efficient market hypothesis (EMH) which claims fundamental analysis is futile due to factors such as insider trading. And when analyzing ratios such return on invested capital (ROIC), a ratio that has been emphasized by Benjamin Graham, Warren Buffett, and Charlie Munger as being of central importance, the mystery of why Medtronic’s stock price has recently been trading at 2015 levels begins to unravel.ⁱ

Prior to the Covidien deal, Medtronic provided investors with a healthy dose of ROIC, and with levels approaching 15% value investors would have few

reasons to steer clear. However, with ROIC hitting the mid-single digits after the Covidien acquisition, always a concern for management when considering a decision to acquire a large company, value investor interest began to cool. And just when ROIC began trending upward, markets were roiled by the global pandemic.

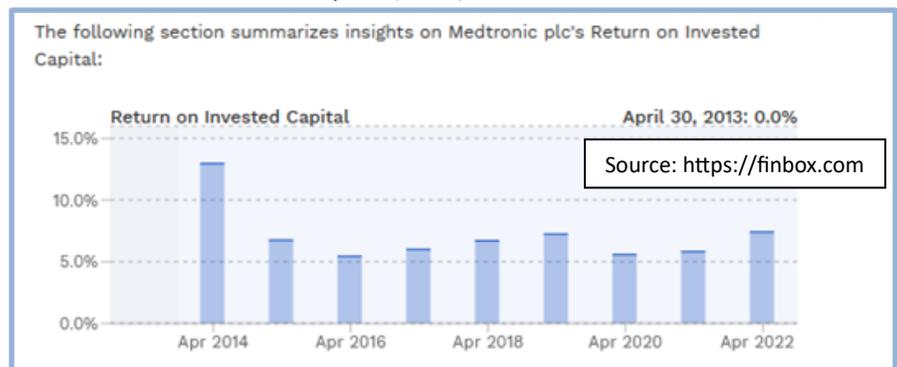


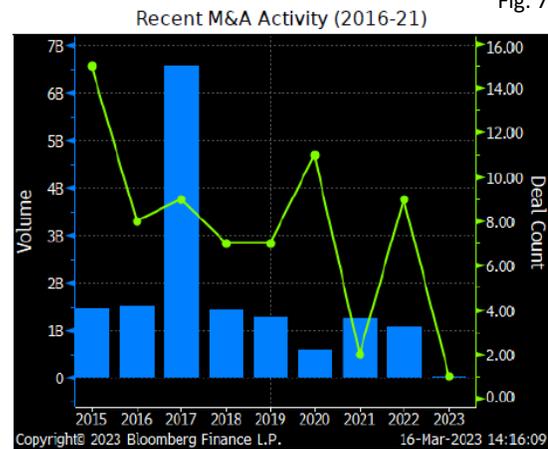
Fig. 6

ⁱ "Over the long term, it's hard for a stock to earn a much better return than the business which underlies it earns. If the business earns 6% on capital over 40 years and you hold it for that 40 years, you're not going to make much different than a 6% return—even if you originally buy it at a huge discount. Conversely, if a business earns 18% on capital over 20 or 30 years, even if you pay an expensive looking price, you'll end up with a fine result." -Charlie Munger, May 5, 1995



The company’s inorganic growth is not limited to “tuck-in” M&A; business unit combinations and internal restructuring, spin-offs (“pruning”), divestments, and joint ventures are also on the menu. In early 2023, Medtronic consolidated its surgical robotics and surgical innovations unit into a single operating unit.¹⁵ Dominic Isolda and I briefly discuss this “effort to empower its operating units to become more nimble and more competitive” in our interview below. The previous two restructuring efforts focused on the respiratory, gastrointestinal, and renal unit, the worst performing business unit of FY2022, and now a joint venture is currently planned with DaVita^j to form a new Renal Care Solutions business, spinning the respiratory business unit off to this new company (which also includes ventilators, a subdivision that took a dive in earnings after coronavirus vaccines were made widely available).¹⁶ Another example in the area of joint ventures is Medtronic’s recently announced partnership with Nvidia to build a portfolio of AI tools intended for a range of healthcare uses, including diagnosis.¹⁷ While the company remains committed to inorganic expansion, announcing nine deals at a total of \$3.3 billion since early 2021, management has signalled to investors by word and deed that where it comes to M&A, discipline is the name of the game.

Fig. 7



Source: Bloomberg Intelligence

Organic growth

The two recent FDA approvals – one long-awaited approval for an insulin pump system and an even more recent approval for two miniature heart-implantable pacemakers – have been big wins for the company’s organic growth. By definition, virtually every surgical and medical device must first go through the arduous FDA approval process, and this is an industry where “business as usual” is easily put on hold. With the FDA approval process complete with two new innovative products belonging to different segments, the path is clear to both “go on the offensive” and create and disrupt “big markets with significant growth potential.” In the medical devices – and patient services – industry, meeting patient needs means multi-billion dollar opportunities, made possible by the billions upon billions the company has put into R&D since Winston Wallin took the helm in 1985. With a range of products in the pipeline (the just-approved Micra miniature pacemakers were first on the list back in October 2020), the company is looking not only to launch these products but also to expand R&D in areas such as “new technology, AI, and data and analytics.”¹⁸ A Bloomberg Intelligence article from March 20, 2023 notes that “Medtronic isn’t sacrificing R&D in face of inflationary headwinds,” confirming the company’s commitment to its sustainable earnings growth strategy presented to investors in late 2020.¹⁹ In its most recent communications with investors, the company emphasizes revenue growth rebounds, highlighting the operationality of its transformation not only to shift its healthcare business model from a volume-based approach to a value-based approach,²⁰ but to streamline operations and improve capital allocation and portfolio management while upgrading global production and supply chain capabilities.²¹

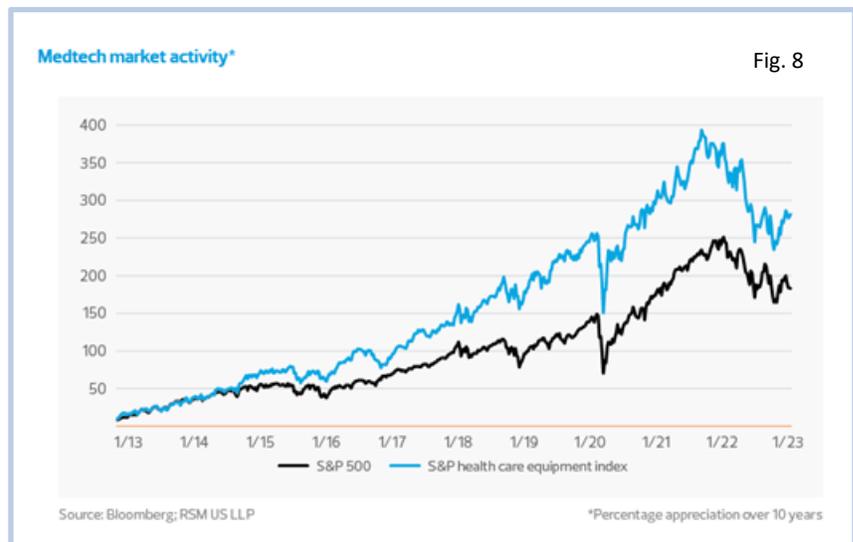
^j DaVita is a kidney dialysis services provider with 69,000 employees based in Denver, Colorado.



The company’s long-term organic growth guidance is 5%-plus while remaining committed to providing shareholders with both an adjusted EPS growth rate of 8% as well as keeping dividend growth commensurate with earnings. The company is cautiously optimistic about the macro headwinds referred to by the aforementioned Bloomberg Intelligence analyst, but the company states that “despite near-term headwinds,” investors can still “expect organic revenue growth acceleration.”²² Current company expectations for organic earnings growth during its current fourth quarter are between 4.5% and 5%, an increase compared to Q4 FY2022 results.²³

Medical Devices Industry Overview

In 2022, a market report created by Fortune Business Insights indicated the global medical devices industry was valued at \$488 billion and is expected to grow to \$719 billion by 2029.²⁴ Another report published by Market.us in March 2023 largely concurred, projecting the size of the surgical and medical devices market to grow at a CAGR of 3.0%, surpassing \$656 billion by 2032.²⁵ The medical devices sector in India alone is expected to surge to \$50 billion by 2025.²⁶ While the pandemic had an extraordinarily negative impact on the MedTech sector, for example many patients postponed elective procedures, headwinds are starting to subside, supply chains are reverting back to normalcy, and expectations for growth are now once again the norm. According to Zacks Investment Analysis, YTD returns for the “Medical - Products” industry are currently at a virtual dead heat with the S&P 500, with the IVV iShares-SP500 ETF returning 9.41% vs. the industry’s return of 8.41%. When looking at 3-month performance, this improves to a respective 2.86% vs. 5.98%, and improves even more to 5.10% vs. 9.54% in returns when looking at performance over the past month.²⁷



According to a 2021 article by Lilac Nachtum, the level of importance of “global integration of the production determinants,” such as “resource differential” and “cost differential” were moderate to low in the medical devices industry, while skills differential and regulatory restrictions are moderate to high. IPR



violations, product life cycle, and flexibility of scaling operations are considered critical in the surgical and medical devices and services sector. Regarding the importance level of delivery and supply determinants, transportations costs are low to moderate in significance, while trade barriers are highly important and transportation speed/distance are critical.²⁸ The medical devices supply chain is exposed to a number of unique risk factors, such as a lack of skilled technicians, complexity in the sourcing of raw materials, aftereffects of the 2020-2021 semiconductor shortage, sterilization constraints in shipping, and cybersecurity concerns.^{29k}

Key drivers include federal funding for Medicare and Medicaid (in the United States), total health expenditure, number of adults aged 65 and older, and number of overall physician visits per year.

Key Trends:

Demographic trends, prevalence of disease, demand for innovation, health awareness, and R&D: As the population in the United States continues to age, opportunities for the medical device industry will increase as the aging population is more likely to have chronic conditions requiring ongoing care, increasing demand.^l This growth factor will be amplified both by an increase in chronic condition prevalence as well as general awareness of and demand for the most advanced medical devices and therapies, compounded by the trend of increasing general health consciousness. These three specific – and inevitable – global growth trends of the medical device industry and the broader healthcare industry will result in an increase in the number of complex surgeries as well as higher revenues, resulting in higher R&D budgets that will in turn increase innovation in MedTech. The logical conclusion here includes a greater number of cutting-edge ideas, advancements in research and technology, and expansion of therapeutic care options available to patients all over the world.

Healthcare systems: During this process, healthcare systems in both the U.S., non-U.S. developed markets, and developing markets alike will be under pressure to adjust to the needs of the world's growing population.

Strategic partnerships: As relationships between medical device company sales representatives and doctors/surgeons is a central element to a company's "moat," companies will continue to place greater emphasis on the underlying value that drives their strategic business partnerships with customers in the healthcare industry.³⁰

^k For an example, refer to 'The PATCH Act.'

^l It is notable that when referring to the general idea of "demand" in the health industry, CEO Geoff Martha will commonly couple the concept of societal demand for innovation with his belief that society also *deserves* the best possible health care.



Increasing innovations in AI: The advent of AI, machine learning, and big data will enable increasing personalization in the delivery of healthcare services. An increase in patient demand for the performance of precisely conducted or assisted robotic surgery procedures is expected.

Digital customer engagement: In efforts to expand product market share and enter new marketplaces, the medical device industry is expected to align with the industry's overall shift towards customer centricity, increasing company capabilities to engage with digitally enabled consumers. This may include such tasks as creating and implementing customer data platforms (CDPs) for use by marketing arms.

3D Printing: Additive manufacturing, otherwise known as 3D printing, will play an increasing role in the surgical and medical device sector. Borne from a need that arose during the global pandemic, this market is expected to grow to \$4.5 billion by 2026.³¹

Emerging economies: Rising national incomes will result in higher spending on healthcare and an increase in the availability of quality healthcare available to countries, increasing demand as a result. Medtronic's gross revenues from non-U.S. developed markets and developing markets overshadowed its U.S. revenues in three of the four business divisions during fiscal year 2022, aligning with this trend. Improving capital markets may amplify this trend.

Supply chain: Supply chain constraints have resulted in increased logistics and procurement costs. Medical device companies are expected to continue placing great emphasis on increasing the resiliency of their supply chains to mitigate shortages and disruptions while increasing transparency. This includes reshoring, and reshoring supply chains, as well as re-mapping supply chains to ensure companies are aware of those exact places that parts originate at every step of the way.³²

Industry consolidation: Words used by observers to describe consolidation in the medical device industry during the 2010s ranged from "continues"³³ to "accelerating"³⁴ to "frenzy,"³⁵ and in the wider healthcare industry, one source recorded 314 mergers and acquisitions in 2021.³⁶ While M&A in 2022 slowed after this record high, current expectations are that industry M&A will once again grow during 2023³⁷ (with a relatively high probability thereafter continue in similar fashion, *at least* during the short- and medium-term).

Increasing emphasis on ESG: Both investors as well as consumers are placing an increasing importance on environmental, social and governance measures (ESG) for both individual companies as well as industries as a whole.

Innovative contracting: Similar to the pharmaceutical industry, the shift in the medical device industry towards value-based contracting, value-based procurement, and value-based care (VBC) is likely to continue.

Emerging countries: Rising national incomes will result in higher spending on healthcare and an increase in the availability of quality healthcare available to countries, increasing demand as a result.



The common wisdom in the world of investments analysis is that roughly half of a stock's returns are directly attributable to the industry the company operates in. The outlook for the medical devices industry is extremely positive, and especially starting with the company's 2020 announcement of an all-encompassing transformation and most recently with the FDA having lifted a warning letter while also approving a highly anticipated diabetes product launch, Medtronic is well-positioned to provide investors with appreciable returns across a 10-year time horizon.

Porter's Five Forces

Bargaining Power of Suppliers – *Moderate/High*

Supplier power can be considered to be greater than buyer power. Of course, one of the outcomes of the power wielded by suppliers to affect the medical device industry by raising prices is the raising of a nation's healthcare costs. The products made by companies in this industry are extremely unique, and medical device companies may not have a lot of choice when it comes to substituting one supplier for another. The products offered by Medtronic are by and large highly specialized and technically advanced, and the number of suppliers that a company like Medtronic can choose from is small.

Bargaining Power of Buyers – *Moderate*

The medical devices market is a rapidly expanding global industry which is in a constant state of flux thanks to innovation, scientific advancement, and technological breakthroughs. The main buyer of these products is hospitals, and the main payers are governmental payers and healthcare insurers. According to Medtronic's most recent annual report, both Governmental programs (such as Medicaid and Medicare) as well as hospitals that purchase the company's technology are increasingly asserting their collective bargaining power to save costs via a range of efforts. At the governmental level, both in the U.S. and abroad, such initiatives include "price regulation, competitive pricing, bidding and tender mechanics, coverage and payment policies, comparative effectiveness of therapies, technology assessments and managed-care arrangements."^m In the U.S., programs such as Medicaid and Medicare, as well as private healthcare insurers and managed health plans, are enacting cost control measures such as limiting reimbursement or connecting reimbursement to patient outcomes, among other measures. At the level of the individual hospital, mechanisms being employed to reduce costs include vendor quantity participation limitations, centralized purchasing, and gainsharing, creating upward

^m Medtronic 2022 10-K



pressures in price sensitivity. However, the bargaining power of buyers is balanced by the non-fragmented nature Medtronic's marketplace, and switching costs are high thanks to Medtronic's emphasis on the importance of relationships between the company reps and buyers/payors. The products sold in this industry are intended to save lives and improve quality of life, and as previously mentioned, patient demand for the most innovative products on the market is increasing. The level of importance tied to these products could not be higher. With that said, while Medtronic has shifted its entire business model towards a value-based approach that aligns with such measures as tying reimbursement to outcomes, the bargaining power of governments, especially the United States government, should never be underestimated.

Threat of New Entrants – *Low*

The surgical and medical device industry is an extremely difficult industry to enter. Potential new entrants would find themselves facing strict governmental regulations, an industry dominated by a small number of (ultra-high cap) multinationals. In the U.S., FDA regulations requires a company to obtain range of approvals and registrations and meet a range of requirements. This includes FDA registration and device listing, premarket notification (510(k)) and premarket approval (PMA), investigational device exemption (IDE), humanitarian device exemption, breakthrough device designation, current good manufacturing practices (CGMPs) quality system regulations, branding requirements, medical device reporting (MDR), and postmarket surveillance.³⁸ In addition, companies that develop, market, and sell products within the medical devices industry must obtain copyrights and patents for these products.

While the threat of new entry is generally low, in consideration of all four areas of Medtronic's business, this threat level is relatively highest within the diabetes segment, where fixed costs associated with product lines are also the lowest. In the company's most recent annual report management mentions only the diabetes division/operating unit directly when referring to competitive pressures, noting risks faced by "continued pump, CGM, and consumable competition in an expanding global market."³⁹

Threat of Substitutes – *Low/Moderate*

The products sold in this market are highly specialized and are manufactured for specific use. As a result, there are largely no substitutes for these products. For example, the substitute product for a robotic surgery device would be the performance of the surgery by a surgeon as was done before the individual hospital acquired a particular surgical robotics platform. However, certain substitutes absolutely do exist, an example product being spinal cord stimulators intended to help treat symptoms associated with chronic pain. For more technically advanced surgical and medical devices, machines, and systems, the number of substitutes drops precipitously.

Intensity of Rivalry – *Moderate/High*



The medical devices market is a rapidly expanding global industry which is in a constant state of flux due to innovation, scientific advancement, and technological breakthroughs. The main buyer of these products is hospitals, and products involve high fixed costs. Competition in the surgical and medical devices industry is extremely high – but it is also highly concentrated. Competition takes place among a small number of massive multinational corporations among products that are all differentiated – even if close enough to be acceptable as direct substitutes. However, many of the products made by Medtronic are extremely unique, and switching costs are relatively high due to quality, reputation, and intangibles such as the massive efforts the company has put into employing the best and brightest representatives who serve as expert specialists to the doctors and surgeons who use and prescribe the company’s products.⁴⁰ In addition, the company’s size enables it to enter certain niche markets, for example via acquisitions, that may be inaccessible to most other companies. Medtronic maintains a large number of both core and distinctive competencies, and while it shares a number of competitive advantages with other medical device manufacturers, the depth and breadth of products across its four separate divisions as well as its global presence means that if competitive advantage among top competitors is relative to company size and macro dynamics, Medtronic undoubtedly enjoys a profoundly advantageous position within this highly competitive and concentrated marketplace.

Competition

Medtronic operates in more than 150 countries within two main markets, the therapeutic medical market and the diagnostic medical market.ⁿ These markets are well known to be characterized by change resulting from technological advances and scientific discoveries. In addition to both small and large medical device manufacturers and MedTech companies, Medtronic also faces competition from pharmaceutical companies and other providers of medical therapies. This includes such luminaries as Johnson & Johnson, Abbot by way of its St. Jude Medical company, and Stryker – the latter of which may also appeal to the value investor. There’s also Intuitive Surgical, famous for its da Vinci robotic surgery systems. While some competitors are doing extremely well in the current climate, there are others such as Philips that aren’t doing so well. In the most recent Koninklijke Philips N.V. annual report, the company’s CEO simply says “2022 was a very disappointing year.” While all companies capable of competing with Medtronic are by definition extremely advanced and the industry itself deserves the attention of most investors (whether value investors, growth investors, etc.), Medtronic performs extremely well and is surprisingly agile for its size. The company doesn’t list any of its competitors by name in its annual reports; to do so would simply be too unwieldy. However, no single company

ⁿ For more information on Medtronic’s global presence, see “Global Positioning” in the Appendix.



operates in all the spaces Medtronic does in concurrent fashion.^o As a “pure play” MedTech company, this will always be a source of competitive advantage for the company that no others can claim.

Cardiovascular: Out of the companies included in this report, MDT has only two real competitors in the cardiovascular space; Abbott (St. Jude) and Boston Medical. Edwards Lifesciences is a leading manufacturer of artificial heart valves, but doesn’t produce pacing systems. Johnson & Johnson does produce Electrophysiology products that treat cardiovascular diseases (Biosense Webster), products that treat hemorrhagic and ischemic stroke (Cerenovus), and products that treat severe coronary artery disease (Abiomed). However, Abbott produces rhythm management products, electrophysiology products, and heart failure related products, structural heart products, as well as continuous glucose and blood glucose monitoring systems and neuromodulation products (including spinal cord stimulators); Abbott is a more competitive with Medtronic than is Johnson & Johnson.

Siemens Health may compete intermittently with products from Medtronic, but Siemens places greater focus on areas such as imaging (X-rays), ultrasound, and pharmaceutical diagnostics. They likely compete in areas such as patient monitoring, anesthesia & respiratory care, as well as diagnostic cardiology, but Siemens Health is not a major competitor to Medtronic. Becton, Dickinson and Co. competes with Medtronic in the area of critical care and the organizational unit they call “Peripheral Intervention” (vascular stents, balloon catheters, chronic dialysis) but doesn’t manufacture the more technologically-advanced surgical and medical products Medtronic specializes in.

Medical Surgical: Intuitive Surgical, Johnson & Johnson, Stryker, and Zimmer Biomet all compete with Medtronic’s Medical Surgical portfolio. However, as Johnson & Johnson doesn’t manufacture robotic surgery machines, this may change somewhat over the course of the coming year when the company spins off its Respiratory, Gastrointestinal, & Renal operating unit (previously housed within “Surgical Innovations”). While Intuitive Surgical will certainly remain competitive in the robotics sphere, Stryker is an especially close competitor, offering a broad portfolio of precise medical instruments (similar to Zimmer, Johnson & Johnson also manufactures precision instruments). Intuitive Surgical, Zimmer Biomet, and Stryker are all among the world’s leading robotic surgery platform manufacturers (along with companies Smith & Nephew and Accuray).

Neuroscience: Stryker’s business operations are separated into two different business segments; MedSurg and Neurotechnology, and Orthopaedics and Spine. In 2022, the MedSurg and Neurotechnology segment earned over \$10 billion, with total revenues that year of \$18.44 billion. It is a top five competitor in the neurotechnology area, alongside Medtronic and Johnson & Johnson, and the company is extremely sophisticated and advanced. Stryker, Abbott, and Johnson & Johnson are most likely Medtronic’s top 3 competitors.

Companies such as Edwards Lifesciences and Abbott (FreeStyle brand), among many others, are direct competitors to MDT in the diabetes segment.

^o For example, while Abbott competes heavily with MDT in the areas of cardiovascular, neuromodulation, and diabetes, Abbott also operates a “Nutritional Products” segment that is roughly half the size of its “Medical Devices” segment.



The Covidien deal provided Medtronic with the ability to compete head-to-head with Johnson & Johnson in an otherwise relatively scattered competitive landscape. The last ten or fifteen years is scattered with lawsuits between these two companies. The decision to acquire Covidien enhanced Medtronic’s competitive advantage; the acquisition made the company the largest medtech company in the world.

Financial Analysis: Comparable Companies

Medtronic is the leading surgical and medical device company in the world, followed by Abbott (St. Jude), Johnson & Johnson, Siemens Healthineers, Becton Dickinson, GE Healthcare, and Stryker.

Leading medical technology companies worldwide based on revenue in 2021 (in billion U.S. dollars)

Medical technology - top companies based on revenue 2021

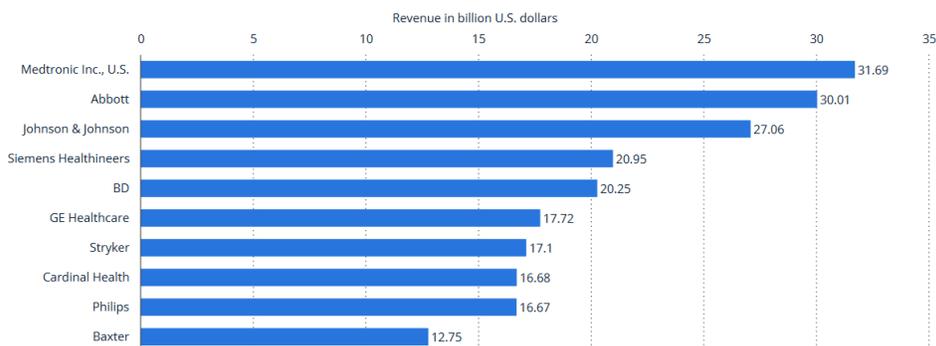


Fig. 9

source: Statista

When looking at Medtronic and its top competitors side-by-side, some interesting things become apparent. First, no company really stands out against Medtronic. While Intuitive Surgical isn’t included in the analysis below because they only compete with Medtronic in a single area, it’s noteworthy that Intuitive has no long-term debt. On the other hand, their P/E ratio is quite high (“87”). GE Health is doing well with a relatively low P/E ratio and solid numbers across the board. However, when comparing Fig. 6 with Fig. 7, MDT outperforms GEHC in appx. half of all comparisons. As indicated above, after the Covidien deal Medtronic has lagged in ROIC, as well as return on assets (ROA) and return on equity (ROE). While Edwards Lifesciences is an incredibly strong performer, when looking at the following figure, its inventory turnover ratio of 1.35 stands out as the lowest in class. Low sales = low growth. As we know, value investors like to see current liabilities at around half of current assets, if not smaller. This factor alone may be enough to compell many investors to turn away from Edwards Lifesciences.



Fig. 10

Comparable Companies Analysis															
Company	Ticker	Share Price	Market Data ('MM)				Financials (\$ mm)			Valuation			P/E (acc. MS)		
			Shares Outstanding	Equity Value	Net Debt	Enterprise Value	Revenue	EBITDA	Net Income	EV/Revenue	EV/EBITDA	P/E			
							EV (2022) MS	EV (Current) MS							
Medtronic	MDT	90.06	1,330	119,780	13,573	133,353	118,570	129,900	31,690	8,780	5,040	3.7	13.5	23.8	24.1
Abbott Laboratories	ABT	112.29	1,740	195,385	7,550	202,935	197,930	202,700	43,650	12,130	6,930	4.5	16.3	28.2	24.8
Becton Dickinson	BDX	258.85	284	73,513	675	74,188	87,340	89,330	18,870	4,410	1,689	4.6	19.8	43.5	47.3
Edwards Lifesciences	EW	85.60	606	51,874	-524	51,350	45,080	51,900	5,382	1,926	1,521	8.4	23.4	34.1	32.2
GE HealthCare Technologies	GEHC	85.00	454	38,590	7,200	45,790	26,090	46,120	18,340	3,230	1,920	1.4	8.1	20.1	20.5
Johnson & Johnson	JNJ	162.53	3,120	507,094	16,140	523,234	459,800	523,210	94,940	28,970	17,940	4.8	15.9	28.3	24.6
Siemens Healthineers AG	SMMNY	29.95	2,240	67,088	-870	66,218	55,480	64,300	21,710	4,260	2,040	2.6	13.0	32.9	25.8
Stryker	SYK	299.31	379	113,438	11,122	124,560	103,780	124,600	18,450	4,040	2,360	5.6	25.7	48.1	38.0
High												8.4x	25.7x	48.1x	
75th Percentile												5.2x	21.6x	38.8x	
Average												4.6x	17.5x	33.6x	(average)
Median												4.6x	16.3x	32.9x	(median)
25th Percentile												3.5x	14.4x	28.2x	
Low												1.4x	8.1x	20.1x	
Medtronic Valuation												EV/Revenue	EV/EBITDA	P/E	
Implied Enterprise Value												146,678	143,267	165,747	
Net Debt												13,573	13,573	13,573	
Implied Market Value												133,105	129,694	152,174	
Shares Outstanding												1,330	1,330	1,330	
Implied Value Per Share (\$)												100.08	97.51	114.42	

The above comparable companies analysis puts the value of one share of MDT stock at \$97.51 – \$114.42. The explanatory power of the above table is relatively high because both EV/EBITDA and P/E are among the few recommended ratios that are indispensable when analyzing companies in the healthcare industry.^p I included the Enterprise Value figures from Morningstar as well as company P/E ratios from Morningstar to compare the model's results to typical source material, and all calculated ratios track. Notice that MDT is among those companies with the lowest P/E ratio of the group.^q Unfortunately, I wasn't able to include Boston Scientific, Zimmer Biomet Holdings, Inc. or Koninklijke Philips N.V. because their P/E ratios were sky high and results became skewed, making the model unusable. Whether included in the above model or not, all else equal these are all really strong companies. They are exceptionally technologically-advanced multinationals, employing tens of thousands of employees globally. And in MedTech, Medtronic is the undisputed leader.

^p See "Burgess, Terrence. *Understanding Valuation Metrics for Equity Securities*. MFS Original Research Series."

^q As stated elsewhere in this report, Medtronic's forward P/E is estimated at appx. "15."



Fig. 11

Ticker	MDT	ABT	BDX	EW	GEHC	JNJ	SMMNY	SYK
	Abbott		Becton	Edwards	GE HealthCare	Siemens Healthineers		
Metrics	Medtronic	Laboratories	Dickinson	Lifesciences	Technologies	J&J	AG	Stryker
Revenues (Bil)	31.69	43.65	18.87	5.38	18.34	94.94	21.71	18.45
Full-Time Employees	95,000	115,000	77,000	17,300	50,000	152,700	70,100	51,000
Liquidity Ratios								
Current Ratio	1.76	1.63	1.04	3.03	1.16	0.99	1.14	1.63
Quick Ratio	1.18	1.23	0.38	1.87	0.76	0.77	0.72	0.87
Profitability Ratios								
Gross Margin	67.99	56.15	44.92	79.93	39.14	67.26	37.47	62.76
Operating Margin	18.16	19.16	12.09	33.24	13.75	22.88	13.47	15.40
ROA	5.56	9.31	3.09	18.12	7.12	9.57	4.44	6.59
ROE	9.60	18.79	6.47	26.14	14.73	23.36	11.21	14.97
ROI	6.92	13.48	4.17	23.76	11.07	17.3 -		8.28
ROIC	7.18	13.27	4.94	23.15	11.30	15.84	11.14	8.27
Solvency Ratios								
LTD to Capital	0.28	0.28	0.35	0.09	0.47	0.26 -		0.42
Debt to Equity	0.46	0.45	0.64	0.10	0.88	0.52	0.02	0.79
Efficiency Ratios								
Asset Turnover	0.35	0.59	0.36	0.64	0.66	0.51	0.48	0.50
Inventory Turnover	2.20	3.38	3.22	1.35	5.17	2.72	3.75	1.72
Receivable Turnover	5.71	6.87	8.61	8.79	5.54	6.04	5.49	5.18

Fig. 11 above provides a glance at some general liquidity, profitability, solvency, and efficiency ratios. One interesting standout is that Johnson & Johnson looks extremely good – they have high gross and operating margins, solid return on equity and return on investment (however, return on assets could be better). They’re solvent and relatively efficient. Of course, three-quarters of their business is in pharmaceuticals so even though they’re one of Medtronic’s greatest competitors they’re not the best company to compare with Medtronic on a 1-to-1 basis. Both Abbott Laboratories and Stryker indicate solid results, but Stryker’s high share price results in an ROIC almost level with that of Medtronic, which may concern value investors. All asset turnover ratios are relatively low across the board, which indicates that asset turnover may not be the best ratio to use while analyzing companies in this industry. However, Medtronic’s operating margins are among the highest in the group. This is a measure of what the company is potentially capable of in terms of profitability, it is one of the most frequently used ratios by analysts. When combining the company’s virtual 2nd place finish in highest operating margin with the knowledge that MDT has an effective tax rate of less than 10%, this makes for a strong argument. Finally, MDT has the second highest current ratio amongst the group. This gives weight to the argument that even though Medtronic’s current assets aren’t quite twice current liabilities as recommended by Benjamin Graham, the industry is profoundly unique, and a certain amount of leeway may appropriate from the value investor’s perspective.



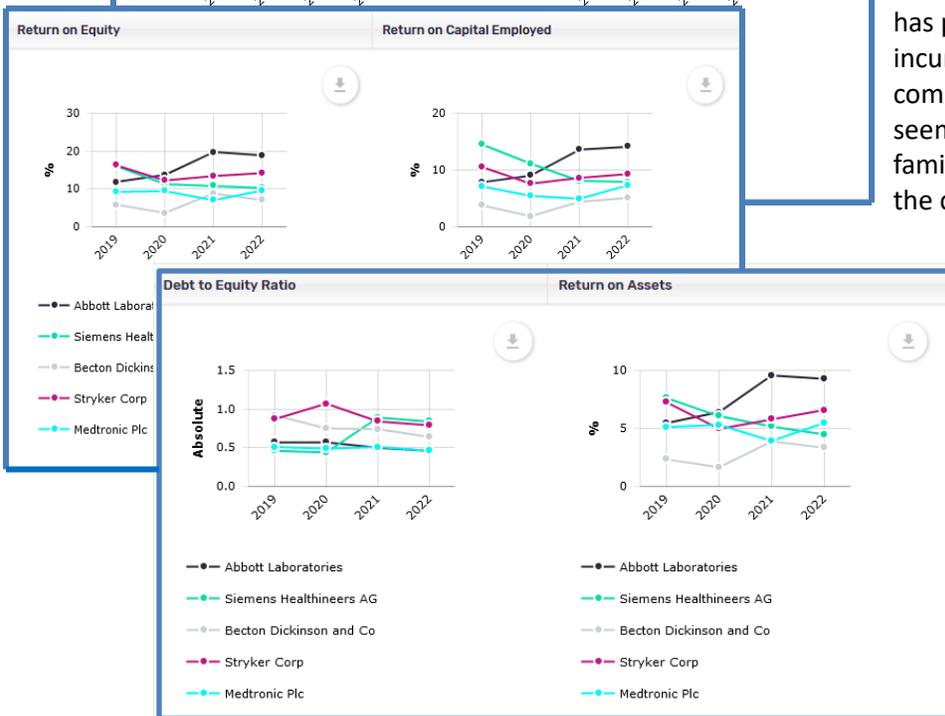
Profitability Ratios (TTM)									
Ticker	MDT	ABT	BDX	BSX	EW	JNJ	SYK	ZBH	
	Johnson & Zimmer								
Company	Medtronic	Abbott Laboratories	Becton Dickinson	Boston Scientific	Edwards Lifesciences	Johnson & Johnson	Stryker	Biomet	Average
Gross Profit Margin	66.73%	56.31%	45.51%	68.44%	79.96%	67.19%	63.13%	70.90%	64.77%
EBIT Margin	19.26%	20.24%	13.46%	16.03%	33.29%	27.27%	19.18%	19.02%	20.97%
EBITDA Margin	28.06%	27.73%	25.47%	24.99%	35.89%	34.48%	24.59%	32.37%	29.20%
Net Income Margin	13.21%	15.88%	8.60%	5.50%	28.28%	13.22%	12.78%	3.33%	12.60%
Levered FCF Margin	10.46%	16.46%	7.60%	9.11%	17.33%	20.21%	9.71%	24.56%	14.43%
Return on Common Equity	7.82%	19.05%	5.99%	3.75%	26.14%	16.80%	14.97%	2.35%	12.11%
Return on Total Capital	4.70%	10.03%	3.78%	4.79%	17.20%	14.54%	7.64%	4.33%	8.38%
Return on Total Assets	4.32%	9.31%	3.03%	2.15%	18.35%	6.79%	6.39%	1.10%	6.43%
CAPEX / Sales	4.78%	4.07%	5.33%	4.64%	4.54%	4.16%	3.19%	6.43%	4.64%
Asset Turnover Ratio	0.33x	0.58x	0.35x	0.39x	0.64x	0.51x	0.52x	0.31x	0.45x
Cash From Operations	5.64B	3.16B	2.34B	1.53B	1.22B	4.67B	2.62B	1.36B	3.46B
Cash Per Share	\$3.40	\$5.69	\$2.16	\$0.65	\$1.26	\$5.41	\$4.87	\$1.80	\$ 3.16
Net Income Per Employee	42.78K	60.29K	20.92K	15.51K	87.97K	83.33K	46.24K	12.86K	38.62K

Fig. 12

Fig. 13



Fig. 14



As can be seen in from Fig. 15 to the left, the company has been diligently paying off debt. Over the last two years, the company has paid off more than 1/6th of the costs incurred by the Covidien acquisition. The company's long-term debt levels may even seem downright low to some observers familiar with the inorganic growth side of the company's M&A growth strategy.

As illustrated in Fig. 13, like most companies, Medtronic's operating margins sank but all trends seem to be pointing upward. The company's wide moat may be one explanation for this recovery. The company's ROE performance is also beginning to realign with the industry standard. In addition, Stryker continuously impressed me in a variety of ways as I conducted my research for this project, and it's noteworthy they

Fig. 15



were able to increase in earnings per share during the pandemic. Fig. 14 illustrates Medtronic’s steady growth in ROE and ROCE, indicating MDT places focus not just on growth but on growth that’s sustainable over the long-term.



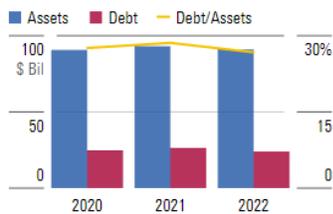
Balance Sheet Analysis

Fig. 16

Financial Statements

Income Statement **Balance Sheet** Cash Flow Annual As Originally Reported

Summary



	2020	2021	2022	Q3 2023
Total Assets (Bil)	90.69	93.08	90.98	94.13
Total Liabilities (Bil)	39.82	41.48	38.26	42.52
Total Debt (Bil)	24.80	26.39	24.11	28.13
Total Equity (Bil)	50.87	51.60	52.72	51.62
Cash & Cash Equivalents (Bil)	10.95	10.82	10.57	11.14
Working Capital (Bil)	11.67	14.04	10.67	10.94

Fiscal year ends in Apr 30 | USD in Bil except per share data

Source: Morningstar

Balance Sheet

In 2013, Medtronic’s assets totaled \$37.4 billion, with \$16.2 billion in liabilities and \$18.7 billion in equity. Today, these figures have grown to \$90.9 billion in total assets, with \$38.2 billion in liabilities and \$52.7 billion in equity. Total assets in 2017 were \$99.8b, potentially illustrating the company’s efforts over the past five years to “prune” parts of its business deemed insufficiently profitable, and as mentioned above these efforts are continuing as part of the company’s overall strategic transformation program. Cash and cash equivalents have remained relatively unchanged from 2013 to 2022 (\$11.1b to



\$10.6b), indicating the company has decided that this is the level of liquid capital bulwark required to maintain their ability to pay current debts, save for emergencies, and meet any necessary covenants related to debt. For and total gross property, plant, and equipment spending has gone from \$6.2 billion in 2013 (\$2.5b net) to \$13.7 billion in 2022 (\$5.4b net), highlighting a sustained effort to make those investments deemed necessary to maintain position as industry leader and achieve sustained growth objectives.

a. Intangibles other than goodwill

Medtronic's intangible assets are a great source of its economic moat, a concept that value investors rely on when analyzing a company's strengths. MDT's intangible assets, including trademarks and patents,^r software and technology, R&D, and customer relationships all coalesce to form an extremely positive image in the minds of both governmental agencies, doctors, and patients all around the world. In all areas where Medtronic offers devices and/or services, Medtronic is always part of the "best possible quality" discussion. As mentioned above and as is self-evident, "quality" has a different context in healthcare when compared to any other industry. Over the past ten years, the company has put special emphasis on both software and technology as well as customer relationships, valuing each in FY2022 at \$10.8b and \$16.9b. Total intangibles other than goodwill in FY2022 totaled \$28.6b. Not only do relationships with doctors, patents, and R&D continue to highlight sources of competitive advantage, but the company's decisive efforts in software and technology enables the company increasingly partner with and integrate into hospital operations,⁴¹ complementing the company's strong relationships with doctors and other decision-makers.

b. Goodwill

Over the last ten years, the company's assets have almost tripled, with goodwill accounting for a sizeable portion of this growth (2013: \$10.3b; 2022: \$40.5b). It is well known that it is a possibility that companies will use the goodwill line item of the Balance Sheet to hide weaknesses. If an acquisition doesn't pay off, as was the case with the merger between AOL and Time Warner, the company will have to write off a sizeable portion of goodwill, resulting in a negative hit to share price. In 2014, Medtronic had \$10.6b in goodwill on its Balance Sheet. As a result of the \$42.8b Covidian purchase in (announced in 2014, closed in 2015), goodwill climbed to \$40.5 billion. Among other things, such as tax-related advantages, this acquisition profoundly deepened the company's competitive advantage – a concept central to what Warren Buffett requires in any investment he makes. However, as listed in the appendix, since the Covidien acquisition, the company has acquired an additional 22 companies as of FY2022, and the goodwill on the Balance Sheet for FY2022 is at virtually the same number, \$40,502 billion. If on the basis of nothing else but the fact that the company has purchased an additional 22 companies (and divested much less), it can be safely said that there is much less weakness living within Medtronic's figures for goodwill than in scenarios such as the AOL/Time Warner merger (which resulted in an initial \$128b in goodwill).⁴²

^r Medtronic currently has approximately 50,000 active patents worldwide, with over half filed in the U.S.



Ratio Analysis

Medtronic's ratios all seem to be trending in the right direction. While Warren Buffett and Charlie Munger are not particularly fond of EBITDA because it doesn't account for the "cost of debt capital or its tax effects,"⁴³ it's worth mentioning that any net-debt-to-EBITDA ratio of over 3 is considered a red flag, and Medtronic hasn't crossed this threshold in at least the past 7 years (if ever). All ratios seem to be headed in the right direction; no red flags stand out.

Fig. 17

Key Stats	Income	Balance Sheet	Cash Flow	Ratios	Segments	Additional	ESG	Custom
Profitability	Growth	Credit	Credit Ex Operating Leases	Liquidity	Working Capital	Yield Analysis	DuPont Analysis	
In Millions of USD except Per Share								
12 Months Ending	2016 Y	2017 Y	2018 Y	2019 Y	2020 Y-	2021 Y	2022 Y	
	04/29/2016	04/28/2017	04/27/2018	04/26/2019	04/24/2020	04/30/2021	04/29/2022	
IFRS 16/ASC 842 Adoption	No	No	No	No	Yes	Yes	Yes	
Total Debt	31,102.0	33,441.0	25,757.0	25,324.0	25,742.0	27,404.0	24,984.0	
Short-Term Debt	993.0	7,520.0	2,058.0	838.0	2,947.0	197.0	3,909.0	
Long Term Debt	30,109.0	25,921.0	23,699.0	24,486.0	22,795.0	27,207.0	21,075.0	
Total Debt/T12M EBITDA	3.80	4.03	2.77	2.84	3.35	3.70	2.89	
Net Debt/EBITDA	2.26	2.38	1.57	1.73	1.93	2.24	1.67	
Total Debt/EBIT	5.80	6.21	3.88	4.04	5.34	6.08	4.33	
Net Debt/EBIT	3.44	3.67	2.19	2.47	3.07	3.68	2.50	
EBITDA to Interest Expense	5.90	7.59	8.10	6.18	7.03	8.00	15.65	
EBITDA-CapEx/Interest Expense	5.11	6.44	7.17	5.40	5.92	6.54	13.18	
EBIT to Interest Expense	3.87	4.92	5.79	4.34	4.39	4.85	10.40	
EBITDA/Cash Interest Paid	6.46	7.32	8.09	9.17	11.94	12.72	16.03	
EBITDA-CapEx/Cash Interest Paid	5.64	6.21	7.16	8.01	10.05	10.39	13.49	
EBIT/Cash Interest Paid	4.23	4.75	5.79	6.44	7.45	7.70	10.65	
Cash Interest Paid	1,266.0	1,134.0	1,147.0	973.0	643.0	582.0	540.0	
Interest Expense	1,386.0	1,094.0	1,146.0	1,444.0	1,092.0	925.0	553.0	
Common Equity/Total Assets	52.25	50.28	55.50	55.85	55.95	55.25	57.76	
Long-Term Debt/Equity	57.83	51.50	46.63	48.77	44.81	52.72	39.97	
Long-Term Debt/Capital	36.20	30.94	30.95	32.42	29.75	34.44	27.12	
Long-Term Debt/Total Assets	30.22	25.96	25.93	27.30	25.14	29.23	23.16	
Total Debt/Equity	59.74	66.44	50.68	50.43	50.60	53.11	47.39	
Total Debt/Capital	37.40	39.92	33.63	33.53	33.60	34.69	32.15	
Total Debt/Total Assets	31.21	33.49	28.18	28.23	28.38	29.44	27.46	
Net Debt/Equity	35.47	39.21	28.59	30.82	29.08	32.14	27.33	
Net Debt/Capital	26.18	28.16	22.23	23.56	22.53	24.33	21.47	
EBITDA	8,181.0	8,300.0	9,284.0	8,927.0	7,677.0	7,402.0	8,654.0	
EBITDA-CapEx	7,135.0	7,046.0	8,216.0	7,793.0	6,464.0	6,047.0	7,286.0	
EBIT	5,361.0	5,383.0	6,640.0	6,268.0	4,791.0	4,484.0	5,752.0	



Three Statement Model and DCF Model Analysis

Three Statement Model and Discounted Cash Flow model

For this report I created a discounted cash flow analysis as well as a dynamically-linked three financial statement model. The results of the three-statement model largely tracked with the discounted cash flow model, with the DCF being slightly more optimistic.

Three statement model:

Fig. 18

MEDTRONIC	Historical Results					Forecast Period				
FINANCIAL STATEMENTS	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Balance Sheet Check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Income Statement										
Revenue	29,953	30,557	28,913	30,117	31,686	33,270	34,767	36,158	37,424	38,546
Cost of Goods Sold (COGS)	9,055	9,155	9,424	10,483	10,145	10,652	11,132	11,577	11,982	12,342
Gross Profit	20,898	21,402	19,489	19,634	21,541	22,618	23,636	24,581	25,442	26,205

Discounted cash flow analysis model:

Fig. 19

Medtronic — Unlevered Free Cash Flow (mm)								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Revenue	28,913	30,117	31,686	33,587	35,602	37,739	40,003	42,403
Cardiovascular	10,468	10,772	11,423	12,108	12,835	13,605	14,421	15,287
Medical Surgical	8,352	8,737	9,141	9,689	10,271	10,887	11,540	12,233
Neuroscience	7,725	8,195	8,784	9,311	9,870	10,462	11,090	11,755
Diabetes	2,368	2,413	2,338	2,478	2,627	2,785	2,952	3,129
COGS	9,424	10,483	10,145	11,131	11,799	12,506	13,257	14,052
Gross Profit	19,489	19,634	21,541	22,456	23,804	25,232	26,746	28,351

The three statement model forecasted 2027 revenues of \$38.56 billion and gross profits of \$26.2 billion, while the DCF model predicts 2027 revenues of \$42.4 billion and \$28.4 billion in gross profits. Though today Medtronic enjoys some extraordinary tax advantages, I assumed a tax rate of 12% from 2023 – 2027. The industry is also expected to grow significantly over the next ten years, but I chose to be relatively conservative in my industry growth expectations, as well.



Implied Share Price Calculation	
Sum of PV of FCF	30,400
Growth Rate	3%
WACC	7.5%
Terminal Value	198,040
PV of Terminal Value	137,812
Enterprise Value	168,213
(+) Cash	10,573
(-) Debt	24,110
(-) Minority Interest	54
Equity Value	154,622
Diluted Shares Outstanding (mm)	1330
Implied Share Price	116.26

		Sensitivity Table				
		Growth Rate				
WACC	116.26	2.00%	2.50%	3.00%	3.50%	4.00%
	4.94%	192.65	230.26	287.26	383.90	583.48
	5.44%	162.80	188.97	225.86	281.80	376.61
	5.94%	140.53	159.69	185.37	221.57	276.45
	6.44%	123.29	137.85	156.65	181.85	217.38
6.94%	109.54	120.94	135.23	153.68	178.41	

Fig. 20

The results of the discounted cash flow analysis, using a levered beta of 0.79, an expected market return of 10%, and a risk-free rate (10-year Treasury) resulted in a weighted average cost of capital (WACC) of 7.5%, translating into an implied share price of \$116.26. In general, I feel like Medtronic is unique in that only seven years ago the company acquired another company that was almost of the same size as Medtronic itself. As a result, modeling Medtronic specifically won't take into account the myriad of competitive advantages that this acquisition is likely to offer the company over the long term. With that said, both models indicate that the company is both profitable as well as currently undervalued, and concur with analysts

Fig. 21

such as Debbie S. Wang from Morningstar and David H. Toung from Argus Research Company. Based on Morningstar's valuation currently standing at \$112 and Argus Research Company's current valuation of Medtronic listed as \$110, it may be possible that the dynamic three statement model is slightly more accurate than my DCF model in terms of overall revenue growth forecast accuracy.

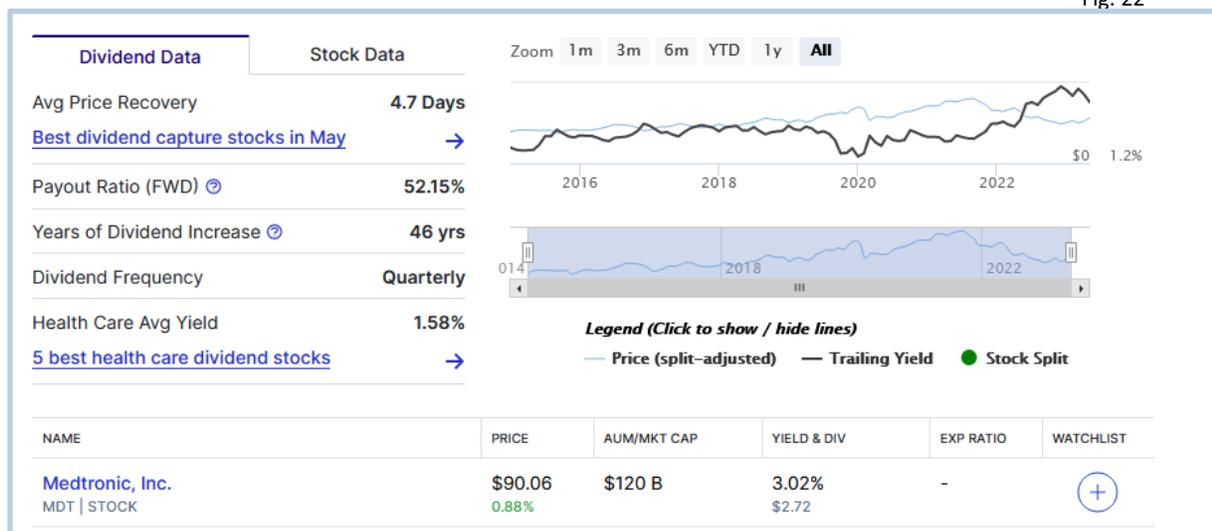




Dividends and Gordon’s Growth Model (DDM)

The company pays a current dividend yield of 3.02%, representing a payment of \$2.72 annually for each share of stock. As mentioned above, CEO Geoff Martha has indicated the company will continue to increase dividends in accordance with the company’s revenue growth. While the company’s current dividend payout isn’t at the top of those companies with the highest dividend yields, it is greater than the average dividend yield across the healthcare industry (1.58%) and is large enough to at least attract the attention of value investors on the basis of dividend payout alone.

Fig. 22



source: dividend.com

Gordon’s Growth Model (DDM)

According to a recent post on *stablebread.com*, “valuation methods like the DCF model are not always the most useful when valuing dividend stocks, which is when dividend discount models come in handy.”⁴⁴ Some may argue DCF models are unsuitable to value companies currently in the midst of a restructuring process; others may wonder if the go-to method for valuing companies for M&A purposes remains equally suitable to value those companies that initiate such M&A deals. Though the DCF model is inarguably indispensable, the DDM model possesses undeniable explanatory power for many firms.



NYU Stern School of Business Professor Aswath Damodaran has frequently written on the pros and cons of the DCF model vs. the dividend discount model. In answering the question “Given that you discount cash flow to equity, should you discount dividends or Free Cash Flow to Equity,” Dr. Damodaran advises that the Dividend Discount Model should be used both “for firms which pay dividends (and repurchase stock) [...],” as well as “for firms where FCFE are difficult to estimate (Example: Banks and Financial Service companies).” He then advises a FCFE Model should be used “for firms which pay dividends which are significantly higher or lower than the Free Cash Flow to Equity,” and “for firms where dividends are not available (Example: Private Companies, IPOs).”⁴⁵ Using Professor Damodaran’s guide to discounted cash flow models as reference, applying a Dividend Discount Model to Medtronic will only strengthen the explanatory power of this report’s final football field analysis.

THE FORMULA FOR VALUING A COMPANY IS SIMPLE, BUT THE TRUE INPUTS ARE NEVER KNOWN
—Warren Buffett

Fig. 23

Medtronic DDM (Gordon's Growth Model, for stable mature companies with dividends growing at steady rate)

$$V = \text{DPS} / (r - g)$$

Firm's value is dividend per share (expected dividend one year from now).

r = required rate of return for equity investors

g = annual growth rate of the dividend forever

Earnings are expected to grow at the same rate as dividends, since payout ratio would otherwise eventually equal 0

Sustainable growth rates should mirror or underperform the growth rate of the economy;

- inflation rates and real growth rate estimates will differ from analyst to analyst
- a growth rate faster than the economy would give us a negative numerator, giving a negative intrinsic value
- DDM is extremely sensitive to inputs for growth rate

MDT

EPS TTM = 3.10 (FY2022: 3.84)

Div'ds /share = 2.72 (\$), current Div'd Yield: 3.06%

Step 1: Determine the growth rate

— Use nominal growth rate of US GDP (6.97%, source: US Bureau of Economic Analysis; 7.375%, source: CEIC)

— The current sustainable growth rate for MDT is 3.19%. Source: Bloomberg 3.35% is the current 5-year zero coupon US Treasury

Step 2: Calculate the Cost of Equity (equals risk free rate [3.35] + beta [0.74] x Market risk Premium [5.94%])

Note: According to Professor Damoradan (NYU Stern), the current ERP is 4.77%, and last month was 4.88%.

Cost of equity is:		If COE is slightly higher:		If COE is slightly higher:		If Beta is slightly higher:
M(Rp) = 5.94%	7.75%	M(Rp) = 6.94%	8.49%	M(Rp) = 7.94%	9.23%	M(Rp) = 7 0.84 10.02%
M(Rp) = 5.54%	7.45%	M(Rp) = 6.54%	8.19%	M(Rp) = 7.54%	8.93%	M(Rp) = 7 0.84 9.68%
M(Rp) = 4.94%	7.01%	M(Rp) = 5.94%	7.75%	M(Rp) = 6.94%	8.49%	M(Rp) = 6 0.84 9.18%
M(Rp) = 4.54%	6.71%	M(Rp) = 5.54%	7.45%	M(Rp) = 6.44%	8.12%	M(Rp) = 6 0.84 8.76%
M(Rp) = 3.94%	6.27%	M(Rp) = 4.94%	7.01%	M(Rp) = 5.94%	7.75%	M(Rp) = 5 0.84 8.34%
M(Rp) = 3.54%	5.97%	M(Rp) = 4.54%	6.64%	M(Rp) = 5.44%	7.38%	M(Rp) = 5 0.84 7.92%

Step 3: Calculate Next year's div'd

DPS equals

0.09

2.81

2.81

[1] Source: <https://pages.stern.nyu.edu/~adamodar/>

*5% is the company's stated goal for annual growth



Fig. 24

Formula is $V = \text{DPS} / (r-g)$

Target:	DPS = \$2.81	\$ 102.06
	$g = 5\%*$	5.00%
	$r = 7.75\%$	7.75%
	if $g = 4.5\%$	4.50%
	if $g = 5.25\%$	5.25%
Gray Sky	4.5% growth	\$ 86.46
Blue Sky	5.25% growth	\$ 112.40

		Sensitivity Table 1						
		Growth Rate (using Bloomberg sustainable growth rate of 3.19%)						
		1.69%	2.19%	2.69%	3.19%	3.69%	4.19%	4.69%
Cost of Equity	5.97%	65.65	74.34	85.67	101.08	123.25	157.87	219.53
	6.27%	61.35	68.87	78.49	91.23	108.91	135.10	177.85
	6.71%	55.98	62.17	69.90	79.83	93.05	111.51	139.11
	7.01%	52.82	58.30	65.05	73.56	84.64	99.65	121.12
	7.45%	48.78	53.42	59.03	65.96	74.73	86.20	101.81
	7.75%	46.37	50.54	55.53	61.62	69.21	78.93	91.83

If we use 10-year Treasury note, and ERP of 4.88% from [1], we get:

$r = 3.45\% + 0.74 * 4.88\% = 7.06\%$

Target:	DPS = \$2.81	\$ 100.00
	$g = 4.25\%$	4.25%
Gray Sky	3.75% growth	\$ 84.89
Blue Sky	4.75% growth	\$ 121.65

		Sensitivity Table 2						
		Growth Rate (using growth rate closest to current share price, 4.69%)						
		3.19%	3.69%	4.19%	4.69%	5.19%	5.69%	6.19%
Cost of Equity	5.97%	101.08	123.25	157.87	219.53	360.26	1003.57	-1277.27
	6.27%	91.23	108.91	135.10	177.85	260.46	484.48	3512.50
	6.71%	79.83	93.05	111.51	139.11	184.87	275.49	540.38
	7.01%	73.56	84.64	99.65	121.12	154.40	212.88	342.68
	7.45%	65.96	74.73	86.20	101.81	124.34	159.66	223.02
	7.75%	61.62	69.21	78.93	91.83	109.77	136.41	180.13

		Sensitivity Table 3						
		Growth Rate (using nominal growth rate of 6.97%)						
		3.97%	4.47%	4.97%	5.47%	5.97%	6.47%	6.97%
Cost of Equity	6.64%	152.31	187.48	243.76	348.32	609.98	2451.69	-1214.11
	7.01%	133.75	160.12	199.45	264.39	392.04	758.03	11404.49
	7.45%	116.68	136.26	163.74	205.09	274.40	414.45	846.54
	7.75%	107.53	123.95	146.27	178.41	228.66	318.28	523.47
	8.19%	96.22	109.15	126.10	149.29	182.92	236.10	332.90
	8.49%	89.91	101.11	115.49	134.63	161.39	201.43	267.88

		Sensitivity Table 4						
		Growth Rate (using avg. US Nom. GDP growth rate Mar 1948 to Dec 2022, 6.17%)						
		3.17%	3.67%	4.17%	4.67%	5.17%	5.67%	6.17%
Cost of Equity	7.38%	96.54	109.56	126.65	150.06	184.08	238.04	336.76
	7.75%	88.73	99.62	113.55	132.01	157.63	195.61	257.68
	8.12%	82.09	91.33	102.90	117.83	137.83	166.01	208.68
	8.49%	76.38	84.31	94.08	106.41	122.45	144.20	175.33
	8.93%	70.49	77.19	85.30	95.31	107.99	124.56	147.12
	9.23%	67.05	73.08	80.31	89.12	100.11	114.19	132.87

		Sensitivity Table 5						
		Growth Rate (using avg. US Nom. GDP growth rate Mar 1948 to Dec 2022, 6.17%)						
		3.17%	3.67%	4.17%	4.67%	5.17%	5.67%	6.17%
Cost of Equity	7.92%	85.48	95.54	108.28	124.94	147.66	180.48	232.05
	8.34%	78.54	86.95	97.37	110.64	128.09	152.08	187.13
	8.76%	72.63	79.77	88.46	99.28	113.10	131.41	156.78
	9.18%	67.56	73.69	81.04	90.03	101.26	115.68	134.90
	9.68%	62.33	67.51	73.64	80.98	89.95	101.16	115.55
	10.02%	59.27	63.94	69.41	75.89	83.72	93.34	105.47



Not only is Gordon’s Growth Model (DDM) useful for valuing stable companies with growing dividends, but Fig. 23 above demonstrates its flexibility. By using two different and sets of metrics with similar plausibility for our CAPM formula,⁵ two slightly different estimates resulted. However, their similarity is indicative of the robust logic in using dividends to value a company’s share price. The flexibility of the model enabled me to construct a series of tables to demonstrate where the share price is calculated to be within a range of different equity cost and growth rate scenarios.

In Fig. 24, Table one, Bloomberg’s current sustainable growth rate assigned to the company is used as a referential mid-point (see Fig. 25). This view even allows us to see what might happen were we to use the current real GDP growth rate^t as one of our inputs as opposed to the nominal growth rate. The cost of equity is the same across the first two tables, and in tables 3-5 the cost of equity increases – either as the result of an increase in market risk premium, or an increase in Medtronic’s beta (0.74 increased to 0.84 in Table 5). Tables 2 and 3 even give examples of what happens when a company’s growth rate supercedes the growth rate of the economy – as stated above in Fig. 23, the numerator becomes larger than the denominator, resulting in a negative number. Tables 1-5 are intended to serve as an example of how an analyst can map out a range of different stock prices based on a small set of assumptions that can potentially be used for purposes of further evaluation.

Fig. 25

Sustainable Growth Rate	2.65	3.23	1.21	3.84	3.76	0.95	3.19
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Source: Bloomberg

In the event of analyzing financial institutions or insurance companies, an Excess Returns Model can be constructed on the basis of a DDM. Unfortunately, as I will illustrate below in the appendix, an Excess Returns Model applied to Medtronic was inaccurate and not useful. For example, JPMorgan has a dividend payout ratio of appx. 33%, while MDT has a div’d payout ratio of between 70-85% at present. Though some believe this ratio will normalize to around 50%, other factors such as ROE in banking vs. ROE in a non-banking industry reduce the explanatory power to the Excess Returns Model here to virtually nil. In this context, it should be mentioned that Medtronic has raised its dividend for the past 45 consecutive years,⁴⁶ and for value investors this is viewed as extremely positive.

⁵ For the first, I used the 5-year zero coupon U.S. Treasury Bill as the basis for the risk-free rate as suggested by Professor Damodaran, and in the second I used the 10 Year U.S. Treasury note. Again, for the first “gray sky, base cash, and blue sky” estimates, I used the annual ERP rate of 5.94% suggested by Prof. Damodaran, and for the second “bear case, base case, and bull case” estimates, I used the monthly and “most up-to-date” ERP numbers, 4.77%. Equity Risk Premium (ERP) is the difference between investor’s expected returns on stocks and the “T. bond rate.”

^t Currently appx. 1.6%.



Risks

As players in a small but highly competitive industry, all multinational surgical and medical device and service companies face an extremely large number of risks in operations. Such risks are easily found in a company's annual reports. The following represent those risks recently mentioned by the company:

Source: FY2022 Medtronic 10K

- competition in the medical device industry;
 - delays in regulatory approvals;
 - the global COVID-19 pandemic, including new COVID-19 variants that may emerge, as well as potential impacts of the pandemic on healthcare staffing levels;
 - reduction or interruption in our supply;
 - failure to complete or achieve the intended benefits of acquisitions or divestitures;
 - adverse regulatory action;
 - laws and governmental regulations;
 - litigation results;
 - quality problems;
 - healthcare policy changes;
 - cybersecurity incidents;
 - international operations, including the impact of armed conflicts;
-
- self-insurance;
 - commercial insurance;
 - changes in applicable tax rates;
 - positions taken by taxing authorities;
 - decreasing selling prices and pricing pressure;
 - liquidity shortfalls;
 - fluctuations in currency exchange rates;
 - inflation; or
 - disruption of our current plans and operations.

In addition, Medtronic's competitive position may be subject to risks such as product performance and reliability, product technology and innovation, product quality and safety, breadth of product lines, product support services, customer support, cost-effectiveness and price, reimbursement approval from healthcare insurance providers, and changes to the regulatory environment. However, during my research I uncovered a set of five specific risks that may or may not fall into any of the above risk categories and are worthy of individual mention. These are as follows:

As previously mentioned, Medtronic is shifting its overall strategic business approach from a volume-based business model to a value-based business model. As the environment for reimbursement is becoming more focused on innovative contracting and outcomes-based models, the ability to fully comprehend all value-based contracting strategies in over 150 countries at a high level of sophistication is an ongoing challenge.

In 2022 a potential authorization risk was found with Medtronic's MiniMed 630G and MiniMed 670G that could allow unauthorized persons to access the insulin pumps, causing them to malfunction.⁴⁷ The



wireless connectivity of such devices means that many potential vulnerabilities, and any similar discoveries in the future could cause short-term price drawdowns.

China’s recent passage of volume-based procurement (VBP) regulations, intended to enable the Chinese government to buy medical device products in bulk at a discount, may have an outsized negative effect on Medtronic in comparison to Medtronic’s competitors due to the company’s exposure in the Chinese marketplace. Geoff Martha has publicly stated the company believes around 80% of its entire portfolio could be impacted.⁴⁸ According to Bloomberg (terminal), some of Medtronic’s largest customers is the China National Pharmaceutical Group and the China Health Group.

In February of 2023, Medtronic lost a court case against Colibri, a competing manufacturer of heart valves. The jury awarded Colibri compensation in the amount of \$106.5 million.⁴⁹ Cases like this are not good for Medtronic’s image, and impact the value created by the company’s intangible assets.

The large valuation of goodwill on the company’s Balance Sheet is likely to remain a source of scepticism for many investors, whether value investors or otherwise. It is a source of uncertainty, and will likely remain so over the short- and medium-term. Out of all bear case arguments, this gray sky argument is the one that potentially carries the greatest weight.

Finally, according to information gathered from Bloomberg (Fig. 26), the company is not a credit risk.



Fig. 26

Field Research



I interviewed Dominic Isolda for this project, a Rutgers MBA alumnus and Principal Product Manager at Medtronic. He works within the Surgical Innovations division of the company's Medical Surgical segment.

TP: This past Tuesday, news came out that an FDA warning letter received by Medtronic in December of 2021 has now been lifted. This news seems to have been welcomed by investors, taking an element of uncertainty off the table. I'd like to start by asking if you have any general thoughts on the matter?

DI: We're all on the same trade sites, like medtechdive, mass device, all of those, so if you're in med device you kind of check those trade journals or those trade sites to get up to speed on that. So, especially if you work for a company, you'll check any time your company's name is mentioned. We were aware on the surgical side – I don't know if everybody was but I certainly was – and an FDA warning letter simply just means that there's going to be significantly more scrutiny on that and it just slows things down when you're getting new products up to speed and you're getting them approved by the FDA, so once the warning letter is lifted it means there's confidence in what you're doing. You've fixed any problems they've been able to find, [another company] had an FDA warning letter based on some manufacturing issues – that company had done everything by hand, and because of that some things weren't tracked the way the FDA would have liked. There were no issues, there were no complications, there was nothing like that but they received a warning letter saying they had to digitize, get up to speed, et cetera. So, when that's lifted, it just means business as usual at that point. More importantly, Medtronic just received FDA approval for the MiniMed 780G insulin pump, and that was a product that had been delayed a few times – again, only speaking about things that are freely available to the public.

TP: It has already been approved for use in the EU since 2020, right?

DI: Yes. So that's going to be a bit of a game-changer for the diabetes operating unit. Each business unit has so much going on.

TP: Speaking of business units, it's my understanding that since 2020, [the design of the operating units is to operate independently in order to improve agility], that this was a decision that CEO Geoff Martha made in 2020 as part of what Medtronic refers to as its transformation or its transformative efforts that it's currently in the midst of.

DI: Yes, things like that are still underway. It was also reported recently that there are a few divisions merging and there's other activity taking place at the operating unit level and this is all to be a bit more agile and put more investment in some of the stronger growth markets.

TP: Dominic, when we first got in contact you mentioned some news that your business unit, Surgical Innovations, was going through some major changes. I was wondering if you could expand on that thought.



DI: Again, it was recently reported a few months ago that the surgical innovations team and the surgical robotics team are being merged, again, in an effort to streamline and make sure that we're focusing on the same call points as well as improving innovations. That said, that news came out a few months ago and those adjustments are still in the works and announcements will be made sometime over the next few months.

TP: Is there anything about Medtronic's overall operations or overall strategy that really rings true to you, something that you can identify with, maybe in terms of strategy or something else along those lines?

DI: I can only mention what has been publicly reported, but overall definitely the company's dedication to innovation and engineering, and more importantly putting the patient first on everything. You can find Medtronic's core tenets everywhere (on its website), and that's not just something we put on a website, that's something we talk about in core team meetings – at the end of the day that's someone's father, that's someone's mother, that's someone's sister, who our devices are helping. And that is incredibly important to me. Compared to my previous life in software, it was a big change of pace to find a company that cares as much as Medtronic does. I'm very happy and it's very easy to believe in what you're doing when you see the positive impact.

TP: Medtronic published the investor handout that complemented the company's presentation at this year's JP Morgan healthcare conference. While reading it, I noticed that Medtronic is placing a lot of emphasis on spending in R&D in terms of capital allocation, which tracks with a recent Bloomberg Intelligence report that stated Medtronic remains committed to R&D spending in spite of inflationary headwinds. In other words, even though the entire marketplace is facing the same macro headwinds, Medtronic is still going full speed ahead with R&D spending, and things like that are what drew my attention to Medtronic in the first place so I agree with you on that.

DI: You're writing a paper on Medtronic from the financial standpoint. When I was in the [MBA] program [at Rutgers Business School], for Organizational Behavior class we were asked to write about a company in your industry that's not your actual organization. I was working at [a company in the medical devices industry] at the time, so I picked Medtronic and wrote a paper on their organizational structure as well as the inclusive environment, benefits with improved education, always promoting growth from an employee standpoint, it's interesting that there's so much to be written about this organization from different perspectives.

DI: That's another thing that helps me believe in this organization, which I knew from that paper I wrote but it wasn't until I got in that the DNA of the organization is that engineering, our tagline is "Engineering The Extraordinary," that's 100% true, that's probably why you're seeing the investment in R&D where it is. However, on top of that, [Medtronic] really takes an active interest in the people in the organization. Everybody feels valued, we have so many different organizations you can be a part of to help foster change, if you see something you think could be improved [those at Medtronic] will let you know which channels to go through but more importantly you are encouraged to speak up. [They will say] if there's a

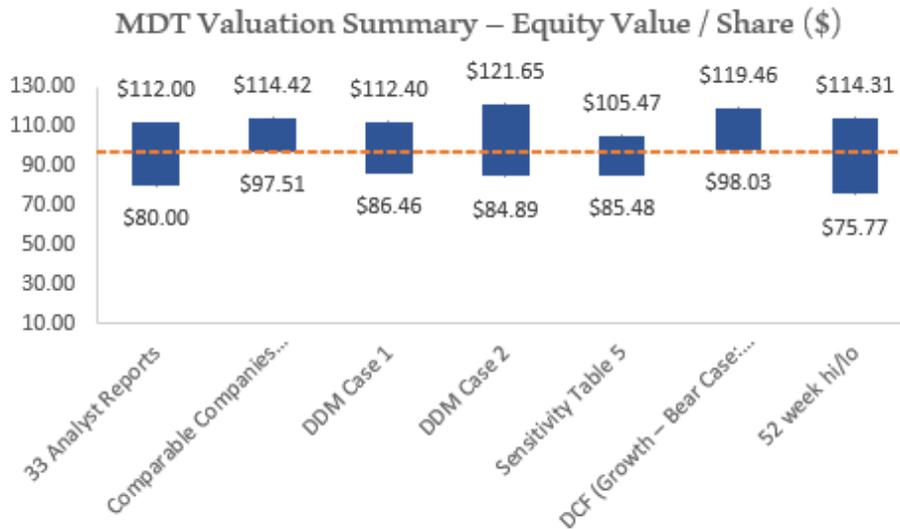


better way of doing something, go ahead and let us know and we'll see what we can do" and you can be a part of that organization and that core team that brings about change.

TP: You mentioned how important engineering expertise is to Medtronic, and something got my attention. What I'm referring to is the "switching costs" element of what investors like Warren Buffett call a company's moat. An economic moat is a way to describe certain elements of a company's competitive advantage are crucial to its ability to not only preserve its position in the marketplace but to grow, the wider the better. I'm talking about the expertise that sales reps [in the medical device industry] bring to their relationships with PCPs and prescribers and surgeons. The most recent Morningstar analyst opinion on Medtronic emphasized the great importance that sales reps – and the company – place on the development of their relationships with surgeons, and that in this relationship the sales rep's role becomes that of a specialized expert giving advice to the surgeon on all aspects of a particular device. These personal relationships are part of what comprises Medtronic's moat. If you have any parting words about the sales reps who are out in the field, or if you have any parting thoughts about anything else, the floor is yours [laughs].

DI: I'll comment on the sales staff. I've worked at three different medical device companies, one as a sales rep, one in marketing, and now again in marketing with Medtronic, and I can 100% say that this is the most experienced and talented sales force. And that's exactly what this team strives for – at least in SI, I can't speak to everybody else, every other business unit, but in the SI side specifically, they train – and are seen – as that trusted advisor to the surgeon. So, should the surgeon have any questions they look to the sales representative to provide guidance "We've seen this before and this is what you can expect." We have sales representatives that range from relatively new to thirty-some years with the organization going up in levels of seniority and leading that role. They truly are that trusted advisor and build great relationships across the HCP environment. That's a huge bonus for Medtronic and the SI division – the experience of the sales force.

Football Field Analysis



When compared against each other, the DCF analysis does seem more optimistic than the two separate Dividend Discount Models. Taking a DDM approach to modeling as a complement to a discounted cash flow model is highly advisable when analyzing more mature companies that have paid dividends to investors for decades.

Medtronic According to Buffett

Medtronic's Current Ratio is 1.76, meaning its current assets are almost twice current liabilities. While this doesn't quite reach Graham's threshold of "twice," four of Medtronic's closest competitors have a Current Ratio close to one, and with the exception of one smaller competitor Medtronic leads its field in this factor. Long-term debt (\$20.32b) is greater than working capital (\$10.67), but it should be noted that at the end of FY2021, the company's long-term debt was \$26.32b. MDT has reported excellent positive net income

**IF YOU AREN'T THINKING ABOUT
BUYING A STOCK FOR TEN YEARS,
DON'T EVEN THINK ABOUT
OWNING IT FOR TEN MINUTES**

–Warren Buffett



results for many years, has paid investors dividends for over thirty consecutive years, and over the past ten years net income has grown from \$3.1b (FY2012) to \$5.1b (FY2022). It has a moderate P/E ratio but its forward P/E ratio of 15 is right at Graham's upper limit. While the company's P/B ratio is not at or below 1.5, it is well below 3 which some value investors use as their benchmark value.⁵⁰

Medtronic isn't the easiest company to figure out. It has a lot of moving parts, and necessities such as navigating the complexities of value-based procurement in far-off lands is a textbook unto itself. However, apart from innovative contracting, once the analyst or the investor starts to understand the nature of the devices the company produces and services it offers, the company's operations become easier to fully and completely comprehend than, say, one of the tech giants. While Warren Buffett is well known for shying away from tech (due to the immense complexity involved in understanding everything a company such as Microsoft or Google does from top to bottom), my research indicates the "MedTech" sector may be an exception.

The Covidien acquisition was controversial to investors due to its cost and impact on ratios such as ROIC, and as stated above it will likely remain so for quite some time. However, I view the Covidien acquisition as akin to the Paul A. Volcker era of the Federal Reserve. Paul Volcker became the chair of the Fed in August 1979, while inflation was at 11% and rising. His policies helped bring inflation down to 4% by 1983, and according to a September 2022 article, by the time he stepped down in 1987, inflation had been all but vanquished. How did he accomplish this? By implementing a dual interest rate/money supply policy that resulted in the federal funds rate reaching 17 percent by March of 1980, resulting in two recessions over the next two years, and by 1982 Volcker stated the recession was not confined to the United States but was a global recession. It was during 1982 when the Fed shifted gears, looking to initiate policies that would reduce interest rates. At first it didn't take, but by August of 1982 traders started to notice the Fed's intentions to see interest rates fall, they acted accordingly and interest rates began to drop while the S&P began to rise. As stated by New York Times author Jeff Sommer, the S&P500 "gained nearly 15 percent for the year and kept going. That was the start of a bull market that continued for 40 years."⁵¹ The point here is perhaps the correct perspective on the company's decision to acquire Covidien is to accept that it would be accompanied by the trade-off of being painful for investors for some time. However, over the long term, with Covidien leading almost every product category it operates in, competing head-to-head with Johnson & Johnson with virtually no other direct competitors between the two, my research indicates investors may be confident that eventually – especially after another few rounds of restructuring and "pruning" – the Covidien acquisition is highly likely to pay off. And that should be comforting to value investors of the Buffett tradition.

In terms of the company's competitive situation, all things considered, I believe it is much more of a positive than anything else. For example, Johnson & Johnson is one of Medtronic's largest competitors, and J&J has recently been going through a great deal of trouble with its consumer segment, going so far as to spinning off what used to account for a sizeable share of its bottom line (taking a hit in reputation in the process). Warren Buffett buys companies that are run by honest people, that have an enduring competitive advantage by way of patents, location, and other elements of intangible assets such as deep personal relationships that increase switching costs. Medtronic absolutely qualifies.



Finally, Warren Buffett says that he doesn't like to buy anything small, he wants companies that can "move the needle." He also says that moving the needle becomes increasingly difficult when a company's revenues become greater and greater. Medtronic is a rare company that is the leader of its industry, earning billions a year, and is currently trading at prices close to where they were eight years ago. Buying into Medtronic today at current prices may be an opportunity that investors of the near future will never again be able to take advantage of. And if investing over a 10-year time horizon, as recommended by Buffett, Medtronic's competitive position, profitability, and growth is likely to grow right along with the medical devices sector itself, which even gray sky estimates predict to double over the next ten years.



No part of this report was created with the aid of AI tools.



APPENDIX

Discounted Cash Flow Model:

Medtronic — Unlevered Free Cash Flow (mm)								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Revenue	28,913	30,117	31,686	33,587	35,602	37,739	40,003	42,403
Cardiovascular	10,468	10,772	11,423	12,108	12,835	13,605	14,421	15,287
Medical Surgical	8,352	8,737	9,141	9,689	10,271	10,887	11,540	12,233
Neuroscience	7,725	8,195	8,784	9,311	9,870	10,462	11,090	11,755
Diabetes	2,368	2,413	2,338	2,478	2,627	2,785	2,952	3,129
COGS	9,424	10,483	10,145	11,131	11,799	12,506	13,257	14,052
Gross Profit	19,489	19,634	21,541	22,456	23,804	25,232	26,746	28,351
Operating Expenses								
Selling, General, Administrative	10,109	10,148	10,292	11,323	12,003	12,723	13,486	14,295
Total Operating Expenses	10,109	10,148	10,292	11,323	12,003	12,723	13,486	14,295
EBITDA	7,793	7,498	8,755	11,133	11,801	12,509	13,260	14,055
Depreciation & Amortization	2,663	2,702	2,707	2,973	3,271	3,598	3,957	4,353
Operating Profit (EBIT)	5,130	4,796	6,048	8,160	8,531	8,912	9,302	9,702
Operating Taxes	(751)	265	456	979	1,024	1,069	1,116	1,164
NOPAT (Net Operating Profit After Taxes)	5,881	4,531	5,592	7,181	7,507	7,842	8,186	8,538
(+) Depreciation & Amortization	2,663	2,702	2,707	2,978	3,271	3,598	3,957	4,353
(-) Capital Expenditures	2,816	3,100	2,894	3,246	3,404	3,485	3,668	3,821
(-) Change in NWC	1,615	(371)	870	571	77	281	498	377
NWC	4,038	3,667	4,537	5,108	5,185	5,466	5,965	6,342
Current Assets	11,083	11,730	12,485	13,369	14,171	15,022	15,923	16,878
Current Liabilities	7,045	8,063	7,948	8,261	8,986	9,555	9,958	10,536
Unlevered Free Cash Flow	4,113	4,504	4,535	6,342	7,297	7,673	7,977	8,693

Assumptions								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Revenue Growth		4.2%	5.2%	6.0%	6.0%	6.0%	6.0%	6.0%
COGS % of Revenue	32.6%	34.8%	32.0%	33.1%	33.1%	33.1%	33.1%	33.1%
SG&A % of Revenue	35.0%	33.7%	32.5%	33.7%	33.7%	33.7%	33.7%	33.7%
Tax % of EBIT	-14.6%	5.5%	7.5%	12.0%	12.0%	12.0%	12.0%	12.0%

Fixed Assets Schedule								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Beginning PP&E	4,675	4,828	5,221	5,413	5,685	5,966	6,174	6,451
Depreciation	2,663	2,707	2,702	2,973	3,123	3,277	3,391	3,543
CapEx	2,816	3,100	2,894	3,246	3,404	3,485	3,668	3,821
Ending PP&E	4,828	5,221	5,413	5,685	5,966	6,174	6,451	6,729

Assumptions								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
D&A as a % of Beginning PP&E	57.0%	56.1%	51.8%	54.9%	54.9%	54.9%	54.9%	54.9%
CapEx as a % of Beginning PP&E	60.2%	64.2%	55.4%	60.0%	59.9%	58.4%	59.4%	59.2%



Net Working Capital									
Fiscal Year	2019A	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Accounts Receivables	6,222	4,645	5,462	5,551	6,218	6,591	6,986	7,405	7,850
Merchandise Inventory	3,753	4,229	4,313	4,616	4,761	5,047	5,350	5,671	6,011
Other Current Assets	2,144	2,209	1,955	2,318	2,390	2,533	2,685	2,847	3,017
Current Assets	12,119	11,083	11,730	12,485	13,369	14,171	15,022	15,923	16,878

Accounts Pay] + (only) Accrued Expenses									
Accounts Payable (AP)	1,996	1,953	2,106	2,276	2,390	2,509	2,635	2,766	2,905
Pension & Other PRBF (payroll) Current	1,545	2,099	2,482	2,121	2,288	2,582	2,736	2,801	3,002
Other Current Liabilities	2,925	2,993	3,475	3,551	3,583	3,895	4,185	4,391	4,630
Current Liabilities	6,466	7,045	8,063	7,948	8,261	8,986	9,555	9,958	10,536

Assumptions									
Fiscal Year	2019A	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Revenue	30,557	28,913	30,117	31,686	33,587	35,602	37,739	40,003	42,403
COGS	9,155	9,424	10,483	10,145	11,131	11,799	12,506	13,257	14,052
Days Sales Outstanding (DSO)	73.3	68.6	61.3	63.4	66.6	66.6	66.6	66.6	66.6
Days Inventory Outstanding (DIO)	147.6	154.0	148.0	160.0	154.0	154.0	154.0	154.0	154.0
Days Payable Outstanding (DPO)	71.0	76.0	71.0	78.0	74.0	74.0	74.0	74.0	74.0
Other Current Assets (incl. cash) as a % of Rev	7.0%	7.6%	6.5%	7.3%	7.1%	7.1%	7.1%	7.1%	7.1%
Pension & Other PRBF (payroll) as a % of Rev.	5.1%	7.3%	8.2%	6.7%	6.8%	7.3%	7.2%	7.0%	7.1%
Other Current Liabilities as a % of Revenue	9.6%	10.4%	11.5%	11.2%	10.7%	10.9%	11.1%	11.0%	10.9%

Unlevered Free Cash Flow (mm)								
Fiscal Year	2020A	2021A	2022A	2023E	2024E	2025E	2026E	2027E
Unlevered Free Cash Flow	4,113	4,504	4,535	6,342	7,297	7,673	7,977	8,693

Projection Year	1	2	3	4	5
Present Value of Free Cash Flow	5,898	6,312	6,173	5,968	6,049

Implied Share Price Calculation	
Sum of PV of FCF	30,400
Growth Rate	3%
WACC	7.5%
Terminal Value	198,040
PV of Terminal Value	137,812
Enterprise Value	168,213
(+) Cash	10,573
(-) Debt	24,110
(-) Minority Interest	54
Equity Value	154,622
Diluted Shares Outstanding (mm)	1330
Implied Share Price	116.26

Sensitivity Table							
		Growth Rate					
		116.26	2.00%	2.50%	3.00%	3.50%	4.00%
WACC	4.94%	192.65	230.26	287.26	383.90	583.48	
	5.44%	162.80	188.97	225.86	281.80	376.61	
	5.94%	140.53	159.69	185.37	221.57	276.45	
	6.44%	123.29	137.85	156.65	181.85	217.38	
	6.94%	109.54	120.94	135.23	153.68	178.41	

Note: Bloomberg indicates the sustainable growth rate for Medtronic is currently 3.19%.

2022 Y
04/29/2022

Sustainable Growth Rate	2.65	3.23	1.21	3.84	3.76	0.95	3.19
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Weighted Average Cost of Capital (WACC)	
Equity (mm)	119,810
Debt (mm)	24,110
Cost of Debt	2.4%
Tax Rate	12.0%
D/(D+E)	16.8%
After Tax Cost of Debt	2.1%
Risk Free Rate (10-Yr Treasury Yield)	3.4%
Expected Market Return	10.0%
Market Risk Premium	6.6%
Levered Beta	0.79
E/(D+E)	83.2%
Cost of Equity	8.6%
WACC	7.5%



Three Statement model:



MEDTRONIC	Historical Results					Forecast Period				
FINANCIAL STATEMENTS	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Balance Sheet Check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Revenue Growth (% Change)		2.0%	-5.4%	4.2%	5.2%	5.0%	4.5%	4.0%	3.5%	3.0%
Cost of Goods Sold (% of Revenue)	30.2%	30.0%	32.6%	34.8%	32.0%	32.0%	32.0%	32.0%	32.0%	32.0%
SG&A (\$000's)	9,974	10,418	10,109	10,148	10,292	10,806	11,346	11,913	12,508	13,133
Research & Development (\$000's)	2,253	2,330	2,331	2,493	2,746	2,883	3,027	3,178	3,336	3,502
Depreciation & Amortization (% of PP&E Open Bal)	25.8%	24.3%	22.9%	21.3%	20.3%	20.3%	20.3%	20.3%	20.3%	20.3%
Other Income/Expense, Operating										
Net Finance Income/Exp (incl. interest) (% of Debt Open Non-Controlling/Minority Interests)	0.7%	1.4%	1.7%	1.7%	0.6%	1.7%	1.0%	1.3%	1.0%	1.0%
Tax Rate (% of Earnings Before Tax)	54.1%	12.7%	-23.9%	8.9%	10.0%	12.0%	12.0%	12.0%	12.0%	12.0%
Balance Sheet										
Accounts Receivable (Days)	73	74	59	66	64	64	64	64	64	64
Inventory (Days)	144	150	164	150	166	166	160	160	150	150
Accounts Payable (Days)	66	78	77	73	82	82	82	82	82	82
Capital Expenditures (\$000's)	2,914	3,054	3,387	3,158	3,881	4,000	4,125	4,250	4,500	4,750
Debt Issuance (Repayment) (\$000's)	(4,457)	(419)	(571)	(694)	(2,314)	-	-	(500)	(2,000)	-
Equity Issued (Repaid) (\$000's)	(50)	14	(81)	(268)	163	-	-	-	(150)	-
Income Statement										
Revenue	29,953	30,557	28,913	30,117	31,686	33,270	34,767	36,158	37,424	38,546
Cost of Goods Sold (COGS)	9,055	9,155	9,424	10,483	10,145	10,652	11,132	11,577	11,982	12,342
Gross Profit	20,898	21,402	19,489	19,634	21,541	22,618	23,636	24,581	25,442	26,205
Expenses										
SG&A	9,974	10,418	10,109	10,148	10,292	10,806	11,346	11,913	12,508	13,133
Research & Development	2,253	2,330	2,331	2,493	2,746	2,883	3,027	3,178	3,336	3,502
Depreciation & Amortization	2,644	2,659	2,663	2,702	2,707	3,038	3,233	3,414	3,583	3,769
Other Income/Expense, Operating	505	258	71	315	862	400	300	300	300	300
Net Finance Income/Exp (incl. interest)	749	1,440	1,092	925	553	370	266	289	217	179
Irregular Income/Expense	+308	364	431	411	155	100	300	400	100	200
Other Income/Expense, Non-Operating	-	(373)	(356)	(336)	(318)	(318)	(318)	(318)	(318)	(318)
Other										
Total Expenses	16,125	17,096	16,341	16,658	16,997	17,497	18,172	19,093	19,944	20,882
Earnings Before Tax	4,773	4,306	3,148	2,976	4,544	5,121	5,464	5,488	5,497	5,322
Taxes	2,580	547	(751)	265	456	615	656	659	660	639
Non-Controlling/Minority Interests	(9)	19	17	24	22	20	15	12	20	5
Net Earnings	2,193	3,759	3,899	2,711	4,088	4,507	4,808	4,830	4,837	4,684



MEDTRONIC	Historical Results					Forecast Period				
FINANCIAL STATEMENTS	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Balance Sheet Check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Balance Sheet										
Assets										
Cash and Cash Equivalents	3,669	4,393	4,140	3,593	3,714	6,013	7,037	7,929	9,905	7,745
Total Short Term Investments	7,558	5,455	6,808	7,224	6,859	10,000	10,000	10,000	10,000	10,000
Total Trade/Accounts Receivable, Current	5,987	6,222	4,645	5,462	5,551	5,834	6,096	6,340	6,562	6,759
Total Inventories	3,579	3,753	4,229	4,313	4,616	4,845	4,880	5,075	4,924	5,072
Other Current Assets	2,187	2,144	2,209	1,955	2,318	3,000	3,000	3,000	3,000	3,000
Current Assets, Total	22,980	21,967	22,031	22,547	23,058	29,691	31,013	32,344	34,391	32,575
Property Plant & Equipment	10,259	10,920	11,644	12,700	13,365	15,962	16,854	17,690	18,607	20,000
Acc. Depreciation	(5,655)	(6,245)	(6,816)	(7,479)	(7,952)	(6,816)	(7,479)	(7,952)	(6,816)	(6,000)
Property Plant & Equipment, Net	4,604	4,675	4,828	5,221	5,413	9,146	9,375	9,738	11,791	14,000
Goodwill	39,841	39,959	39,841	41,961	40,502	39,841	39,000	39,000	39,000	39,000
Intangibles other than Goodwill, net	21,425	20,560	19,063	17,740	15,594	15,594	15,000	15,000	15,000	15,000
Taxes Receivable, Non-Current	1,465	1,519	2,832	3,169	3,403	2,832	3,169	3,403	2,832	3,169
Other Non Current Assets	380	1,014	2,094	2,443	3,011	2,443	3,053	2,490	3,059	2,443
Total Assets	90,695	89,694	90,689	93,081	90,981	99,547	100,610	101,976	106,073	106,187
Liabilities										
Trade/Accounts Payable, Current	1,628	1,953	1,996	2,106	2,276	2,393	2,501	2,601	2,692	2,773
Total Current Portion of Long Term Debt	1,360	838	2,776	11	3,742	2,000	2,000	2,000	2,000	2,000
Total Provisions (employee entitlements), Current	1,988	2,189	2,099	2,482	2,121	2,121	2,121	2,121	2,121	2,121
Taxes Payable, Current	979	567	502	435	704	435	704	435	704	435
Accrued Expenses, Current	3,431	2,925	2,993	3,475	3,551	3,475	3,551	3,475	3,551	3,475
Other accrued expenses	4,410	3,492	3,495	3,910	4,255	3,910	4,255	3,910	4,255	3,910
Total Current Liabilities	9,386	8,472	10,366	8,509	12,394	10,424	10,877	10,632	11,068	10,804
Total Financial Liabilities, Non-Current	23,699	24,486	22,021	26,378	20,372	26,572	22,195	19,055	17,865	15,216
Provision for Employee Entitlements, Non-Current	1,425	1,651	1,910	1,557	1,113	1,557	1,113	1,557	1,113	1,557
Total Trade and Other Payables, Non-Current	3,051	2,838	2,682	2,251	2,087	2,251	2,087	2,251	2,087	2,251
Total Tax Liabilities, Non-Current	1,423	1,278	1,174	1,028	884	1,028	884	1,028	884	1,028
Other Non-Curre	889	757	1,664	1,756	1,410	1,756	1,410	1,756	1,410	1,756
Total Liabilities	39,873	39,482	39,817	41,479	38,259	43,588	38,566	36,279	34,427	32,612
Shareholder's Equity										
Paid in Capital	28,127	26,532	26,165	26,319	24,566	24,566	24,566	24,566	24,416	24,416
Retained Earnings	24,379	26,270	28,132	28,594	30,250	30,000	34,808	39,638	44,476	49,159
Other Reserves/Accum/Comp.Inc	(1,786)	(2,711)	(3,560)	(3,485)	(2,265)	(3,485)	(4,000)	(4,000)	(6,000)	(6,000)
Non-Controlling/Minority Interests in Equity	102	121	135	174	171	121	177	174	171	121
Shareholder's Equity	50,822	50,212	50,872	51,602	52,722	51,202	55,551	60,378	63,063	67,696
Total Liabilities & Shareholder's Equity	90,695	89,694	90,689	93,081	90,982	94,790	94,117	96,657	97,489	100,308
Shareholder's Equity	50,822	50,212	50,872	51,602	52,722	55,959	62,044	65,697	71,646	73,575



MEDTRONIC	Historical Results					Forecast Period				
FINANCIAL STATEMENTS	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Balance Sheet Check	OK	OK	OK	OK	OK	OK	OK	OK	OK	OK
Cash Flow Statement										
Operating Cash Flow										
Income/Loss before Non-Cash Adjustment	3,095	4,650	4,806	3,630	5,062	4,507	4,808	4,830	4,837	4,684
Depreciation & Amortization	2,644	2,659	2,663	2,702	2,707	3,038	3,233	3,414	3,583	3,769
Provision & Write Off of Assets	52	78	99	128	58	128	58	128	58	128
Stock based compensation	344	290	297	344	359	344	359	344	359	344
Deferred Income Tax	(919)	(304)	(1,315)	(422)	(604)	(422)	(604)	(422)	(604)	(422)
Operating Gains/Losses	38	457	406	308	-	457	406	308	-	457
Gain/Loss on Disposable/Sale of Business, Non-Cash Ar	(697)	-	-	-	-	-	-	-	(500)	-
Net Investment Income/Loss, Non-Cash Adjustment	227	-	-	-	-	-	-	-	-	-
Other Non-Cash Items	73	257	217	251	138	251	138	251	138	251
Change in Inventory	(192)	(274)	(577)	78	(560)	(300)	(560)	(300)	(560)	(300)
Change in Receivables	(275)	(581)	1,291	(761)	(477)	(761)	(500)	(500)	(500)	(500)
Change in Payables And Accrued Expenses	65	399	(44)	531	213	213	213	213	213	213
Change in Other Working Capital	229	(624)	(609)	(549)	(65)	394	190	339	(20)	264
Net Cash from Operations	4,684	7,007	7,234	6,240	6,831	7,151	7,852	7,904	8,440	8,189
Investing Cash Flow										
Purchase of Property, Plant, and Equipment	(1,068)	(1,134)	(1,213)	(1,355)	(1,368)	(1,368)	(1,368)	(1,368)	(1,368)	(1,368)
Acquisitions, Net of Cash Acquired	(137)	(1,827)	(488)	(994)	(91)	(994)	(500)	(994)	(500)	(994)
Proceeds from Sale of Businesses	6,058	-	-	-	-	-	-	-	-	-
Purchases of Marketable Securities	(3,200)	(2,532)	(11,039)	(11,808)	(9,882)	(9,000)	(11,000)	(11,000)	(11,000)	(11,000)
Sales and Maturities of Marketable Securities	4,227	4,683	9,574	11,345	9,692	9,692	9,692	9,692	9,692	9,692
Other Investing Cash Flow	(22)	36	(37)	(54)	(10)	-	-	-	-	-
Cash from Investing, Net	5,858	(774)	(3,203)	(2,866)	(1,659)	(1,670)	(3,176)	(3,670)	(3,176)	(3,670)
Financing Cash Flow										
Proceeds from Issuance of Common Stock	403	992	662	474	429	474	429	1,000	429	1,000
Repurchase of Ordinary Shares	(2,171)	(2,877)	(1,326)	(652)	(2,544)	(652)	(2,500)	(2,000)	(2,000)	(2,000)
Change in Short-Term Borrowings, Net	(293)	(713)	(17)	(375)	(200)	(200)	(300)	(200)	(300)	(300)
Proceeds from Issuance of Long-Term Debt	21	7,794	5,568	7,172	5,568	5,000	5,568	3,000	4,000	4,000
Payments on Long-Term Debt	(7,370)	(7,948)	(6,110)	(7,367)	(1)	(7,000)	(7,000)	(7,000)	(8,000)	(10,000)
Common Stock Dividends Paid	(2,494)	(2,693)	(2,894)	(3,120)	(3,383)	(3,383)	(4,000)	(4,100)	(4,200)	(4,300)
Other Financing Cash Flow (sb. Equity Issued (Repaid))	(50)	14	(81)	(268)	163	(268)	163	(268)	163	(268)
Cash from Financing, Net	(11,954)	(5,431)	(4,198)	(4,136)	(5,336)	(5,851)	(5,569)	(8,568)	(8,337)	(10,868)
Effect of exchange rate	114	(78)	(86)	215	(231)	215	(231)	215	(231)	215
Net Change in Cash										
Net Increase (decrease) in Cash [DELETE or indicate to	(13,128)	2,350	6,239	4,970	3,154	2,970	(893)	3,006	3,279	991
Net Increase (decrease) in Cash	(1,298)	724	(253)	(547)	(395)	(155)	1,918	(2,114)	(1,304)	(3,151)
Opening Cash Balance	4,967	3,669	4,393	4,140	3,593	3,198	6,013	7,037	7,929	9,905
Closing Cash Balance	3,669	4,393	4,140	3,593	3,198	6,013	7,037	7,929	9,905	7,745
Supporting Schedules										
Working Capital Schedule										
Accounts Receivable	5,987	6,222	4,645	5,462	5,551	5,834	6,096	6,340	6,562	6,759
Inventory	3,579	3,753	4,229	4,313	4,616	4,845	4,880	5,075	4,924	5,072
Accounts Payable	1,628	1,953	1,996	2,106	2,276	2,393	2,501	2,601	2,692	2,773
Net Working Capital (NWC)	7,938	8,022	6,878	7,669	7,891	8,285	8,475	8,814	8,794	9,058
Change in NWC	200	84	(1,144)	791	222	394	190	339	(20)	264
Depreciation Schedule										
PPE Opening	10,259	10,920	11,644	12,700	13,365	15,000	15,962	16,854	17,690	18,607
Plus Capex	2,914	3,054	3,387	3,158	3,881	4,000	4,125	4,250	4,500	4,750
Less Depreciation	2,253	2,330	2,331	2,493	2,746	3,038	3,233	3,414	3,583	3,769
PPE Closing	10,920	11,644	12,700	13,365	14,000	15,962	16,854	17,690	18,607	19,588
Debt & Interest Schedule										
Debt Opening	30,181	25,742	25,323	24,752	24,058	26,572	26,572	19,055	21,744	17,865
Issuance (repayment) (s.b. DELETE Debt Issuance (Re	(4,457)	(419)	(571)	(694)	(2,314)	-	-	(500)	(2,000)	-
Debt Closing	25,724	25,323	24,752	24,058	21,744	26,572	22,195	21,744	17,865	15,216
Interest Expense	200	364	431	411	155	370	266	289	217	179



Excess Returns Model (depricated, for illustrative purposes only)

Medtronic Excess Return Model (terminated attempt, for illustrative purposes only)

Excess Equity Return = (return on equity - cost of equity)*(equity capital invested)

To begin, we need information on "Return on Equity" for MDT

In Addition, we need:

- Net income
- Book Value of Equity (ie, Shareholder's Equity)
- May use TTM data or latest quarterly data and multiply by four

MDT FY2022 Net Income:	5,039
MDT Equity FY2022:	52,722
Return on Equity (ROE):	9.56%

CAPM; Beta	0.74	
Rf rate:	3.45%	3.45% is the current U.S. 10 Year Treasury Note
ERP:	5.33%	Source: https://pages.stern.nyu.edu/~adamodar/
Cost of equity:	7.39%	

Cost of equity=	3,898.37
Excess equity return	1,140.63 original net income minus cost of equity

Earnings per share	\$3.84
Dividends per share	\$2.72
Return on equity	9.56%

Retention ratio	29.17%	The retention ratio tells us how much MDT retains its earnings each year.
Div'd payout ratio	70.83%	— Retained Earnings are added to shareholder's equity each period.

Then find total amount of div'ds paid out from the firm's net earnings. Multiply net earnings by div'd payout ratio.

Div'ds paid	3,569.29
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To find what the Retained Earnings at the end of the year for JPM would be

RE = Beg. NI - div'ds ;	1,469.71
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Take these RE's and add those to shareholder's equity we've been using

Beginning equity:	54,191.71
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Setup calculating the PV of our excess returns. Important, because at the end these will be summed with Beg. Sh.Eq to find the value of MDT. Use a formula from a DCF.

Cost of equity = 1 + cost of equity: **1.074**

Beg. BV of Equity + RE = Beg. BV of Equity for next year
Eq. Cost is Beg. BV of Equity * Cost of Equity
Net Income is Beg. BV of Equity * ROE

And we were extending the formula to find the PV of those excess returns we calculated earlier. We take the excess returns and divide them by our cost of equity we just calculated.

PV of Excess Returns: **1,062.10**

Next cost of equity extension **1.142761**

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Years	1	2	3	4	5	6	7	8	9	10	Terminal Year (3%)
Net Income	5,039	5,179	5,325	6,163	6,489	7,478	7,911	9,092	9,663	11,153	11,487.08
-Equity Cost	3,898	4,007	4,116	5,253	5,530	12,938	13,686	14,477	15,386	16,449	16,942.60
Excess Equity Return	1,141	1,172	1,209	910	959	-5,460	-5,776	-5,385	-5,724	-5,297	-5,455.52
Cumulated Cost of Equity	1.0739	1.1428	1.2216	1.3059	1.3960	1.4923	1.5953	1.7054	1.8231	1.9488	1.9488
Present Value of Exc. Ret's	1,062	1,026	989	697	687	-3,659	-3,620	-3,158	-3,140	-2,718	-2,718
Beginning BV of Equity	52,722	54,192	55,702	58,365	61,447	64,691	68,430	72,385	76,931	82,246	84,713.00
Cost of Equity	7.39%	7.39%	7.39%	9.00%	9.00%	20.00%	20.00%	20.00%	20.00%	20.00%	20.00%
Equity Cost	3,898	4,007	4,116	5,253	5,530	12,938	13,686	14,477	15,386	16,449	16,942.60
Return on Equity	9.56%	9.56%	9.56%	10.56%	10.56%	11.56%	11.56%	12.56%	12.56%	13.56%	13.56%
Net Income	5,039	5,179	5,325	6,163	6,489	7,478	7,911	9,092	9,663	11,153	11,487.08
Div'd Payout Ratio	70.83%	70.83%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	45.00%	45.00%	50.00%
Div'ds Paid	3,569	3,669	2,663	3,082	3,244	3,739	3,955	4,546	4,348	5,019	5,743.54
Retained Earnings	1,470	1,511	2,663	3,082	3,244	3,739	3,955	4,546	5,314	6,134	5,743.54

(BV of) Equity Currently Inv	52,722.00
PV of Equity Excess Returns	43,019.55
Value of Equity	95,741.55

Value of Equity	95,741.55
# Shares Outstanding	1,330
Value Per Share	\$ 71.99

Note 1:

Cardiovascular Portfolio: additional product information

Products include implantable pacing systems and implantable cardioverter defibrillator (ICD) devices, such as the Visia AF MRI SureScan, Evera MRI SureScan, BlueSync-enabled ICDs belonging to Medtronic's



Cobalt and Crome line and leads such as the Spring Quattro Secure. Medtronic's pacemaker range also includes pacemakers that treat patients diagnosed with atrioventricular block (a heart rhythm disorder causing the heart to beat slower than normal), including the Micra VR device and the Micra AV device. The company's Micra Transcatheter Pacing System is leadless, and as a result does not require a subcutaneous device pocket which in the past had been a source of difficulty for some elderly and thin patients in terms of potential skin protrusion.⁴ Apart from offering remote monitoring services and software, as well as antibacterial envelopes to help prevent infection that can result from the surgical implantation of pacemakers, this business unit also offers implantable cardiac resynchronization therapy devices (CRT-Ds and CRT-Ps) and MRI Quad CRT-D and CRT-P SureScan systems from the Claria/Amplia/Compia labels and the Percepta/Serena/Solara labels. Additional products include cardiac ablation products and systems meant for the treatment of patients diagnosed with atrial fibrillation (a condition that causes an irregular heart rate, commonly abbreviated as "AF") and insertable cardiac monitoring systems which assists who may be exhibiting early warning signs of potential cardiac arrhythmia (an irregular heartbeat).

Structural Heart & Aortic

The Structural Heart & Aortic Operating Unit and the Cardiac Surgery Operating Unit belong to the Structural Heart & Aortic division. The medical devices produced and sold by these operating units are intended to treat heart valve disorders and aortic disease, including tissue and mechanical valve products, CoreValve family aortic valve systems, Transcatheter Pulmonary Valves, blood-handling products, as well as endovascular stent grafts and accessories, surgical ablation systems and positioning and stabilization technologies.

Coronary & Peripheral Vascular

The two operating units of the Coronary & Peripheral division includes the Coronary & Renal Denervation Operating Unit and the Peripheral Vascular Health Operating Unit. The product lines and therapies belonging to these two operating units are designed to treat coronary artery disease, peripheral vascular disease, and venous disease. These include principal products such as a range of balloon angioplasty catheters (Euphora balloons), peripheral drug-coated balloons (including the IN.PACT lineup of drug-coated balloons), vascular stents (Abre), coronary stents and associated delivery systems, stent and angioplasty systems, directional atherectomy products (HawkOne directional atherectomy system), diagnostic catheters, guide catheters and guide wires, carotid embolic protection systems and products for both superficial (ClosureFast radiofrequency ablation system, VenaSeal Closure System) as well as deep venous disease.

Note 2:

⁴ <https://www.cureus.com/articles/46649-device-pocket-challenges-in-elderly-and-thin-individuals#!/>



Medical Surgical Portfolio: additional product information

Surgical Innovations

The operating units of the Surgical Innovations division are split between Surgical Innovations and Surgical Robotics. As part of Medtronic's continuing and extensive transformation program – a strategic restructuring process that in no small part involves the element of cost reduction – these two operating units were recently consolidated under the umbrella of the Surgical Innovations division.^v As a result, the operating units herein are described as offering both general as well as advanced surgical products and devices. This includes fissure meshes (Parietex ProGrip), surgical endoscopic and universal staplers (Tri-Staple, Endo GIA, Signia Powered Stapling System), dissection systems (Sonicision system, LigaSure Exact Dissector), and electrosurgical hardware and instruments (Valleylab FT10 energy platform, Force TriVerse electrosurgical pencils). Today, this operating unit also leads the company's innovation efforts surrounding surgical artificial intelligence (AI) and digital- and robotic-assisted surgery products and systems. This includes Medtronic's Hugo robotic-assisted surgery (RAS) system,^w which is taking an increasingly leading role in the company's long-term growth strategy and for which the company enrolled its first clinical trial patient only in December 2022.^x The company's surgical AI innovations also include the Touch Surgery Enterprise, an AI-powered surgical video management and analytics platform for the operating room (OR) that provides surgeons and OR teams a tool they can use to enhance performance and discover new techniques, while also offering a cutting-edge method by which advanced surgeons and teams can train others. Not only is the Touch Surgery Enterprise compatible with the Hugo RAS system, but in early 2022 Medtronic announced it entered into an agreement with Vizient to add the AI platform to those platforms already offered by Vizient. More than half of all healthcare providers in the United States are currently served by Vizient's various platforms.^z

Respiratory, Gastrointestinal, & Renal

Within the Respiratory, Gastrointestinal, & Renal division lies the Respiratory Interventions, Patient Monitoring, Gastrointestinal, and Renal Care Solutions Operating Units. The company designs, produces, and sells products in both traditional fields of patient monitoring (Nellcor pulse oximetry monitors and sensors, Bispectral Index (BIS) brain monitoring technology), renal disease treatment (Carpediem dialysis machines, Amplya dialysis machines), and respiratory interventions (Puritan Bennett 980 and 840 ventilators, McGRATH MAC video laryngoscopes), while also becoming increasingly engaged and productive in the nascent fields of minimally invasive gastrointestinal and hepatologic diagnostics and

^v <https://www.massdevice.com/medtronic-combines-surgical-robotics-and-surgical-innovations-units/>

^w The other two constituents of Medtronic's robotic surgery portfolio, which include three robotic platforms in total, are the Mazor X Stealth Robotic Guidance System and the StealthAutoguide, both of which reside within the Neuromodulation Operating Unit of the company's Neuroscience division.

^x <https://news.medtronic.com/2022-12-15-Medtronic-announces-first-patient-enrolled-in-U-S-clinical-trial-for-Hugo-TM-robotic-assisted-surgery-system>

^y Intuitive Surgical's da Vinci was approved for use by the FDA in 2000, meaning that

^z <https://www.massdevice.com/medtronic-inks-deal-to-add-hugo-compatible-ai-based-surgical-system-to-vizients-offerings/>



therapies (PillCam capsule endoscopy system, EndoFLIP imaging systems, GI Genius intelligent endoscopy module, Cool-tip radiofrequency ablation system).

Medical Surgical business end market growth profile:

Competitors: Intuitive Surgical – da Vinci robotic surgery system, and the Mako robotic surgical system by Stryker are two important players in this area. As opposed to Medtronic, which operates its company as four distinct divisions, Intuitive Surgical operates its business as a single segment.

Medtronic is well positioned within the overall robotic surgical system market, but it is not yet a leader. The top spot belongs to Intuitive Surgical, which is expected to retain its dominant position. Intuitive Surgical differs from Medtronic in that it operates its business as a single segment. While Morningstar describes both Medtronic and Intuitive Surgical as having a moat rating of “Wide; Trend: Stable,” and it is remarkable that a company the size of Intuitive Surgical (\$103.6 billion market capitalization) has no long-term debt, Intuitive Surgical also currently has a Price/Earnings ratio of 81.30. This alone may be enough to sufficiently convince value investors that while the company is highly profitable, it may be difficult to argue the company’s stock is currently cheap.

Note 3:

Neuroscience Portfolio: additional product information

Cranial & Spinal Technologies (Operating Unit)

This division/Operating Unit is engaged in offering medical devices and implant products that are used in spinal and musculoskeletal system treatments. Cranial & Spinal Technologies also offers the dental and orthopedic end markets a range of platforms used in spine and cranial surgical procedures, including power instrument systems (MR8 high-speed drill system), navigation systems (Visualase MRI-guide laser ablation, StealthStation S8 Navigation System), imaging systems (O-arm Imaging System), and nerve monitoring systems (NIM Nervassure). This group of products also includes fixation systems (CD HORIZON SOLERA VOYAGER), biologic solutions products intended for selected oral maxillofacial, trauma, and spinal treatments (INFUSE Bone Graft), Demineralized Bone Matrix products (MASTERGRAFT, MAGNIFUSE), and products developed to treat spine conditions such as degenerative disc disease, spinal tumors, spinal deformity, stenosis, and fractures of the spine. Moreover, as mentioned above, this part of Medtronic’s business offers robotic guidance systems used in spinal/cranial procedures, and this division/operating unit complements the Surgical Innovations operating unit with both the Stealth Autoguide cranial robotic guidance platform as well as the Mazor X robotic guidance systems.

Specialty Therapies



The Specialty Therapies Division is split into three segments: Neurovascular; Ear, Nose, and Throat (ENT); and Pelvic Health. This division works in the area of treating patients diagnosed with ENT diseases, acute ischemic and hemorrhagic stroke, while also offering Percutaneous Tibial Neuromodulation therapy (NURO, InterStim X, InterStim Micro). Products and services offered by the company to help treat diseases of ENT include the Straightshot M5 Microdebrider Handpiece, the FUSION Compact and StealthStation ENT Navigation System, as well as a range of products intended for hearing restoration and to treat obstructive sleep apnea. Neurovascular products treat brain region vasculature diseases, which includes coils, neurovascular stent retrievers, acute ischemic stroke treatment devices (Solitaire revascularization product portfolio), and flow diversion products (Pipeline Flex Embolization Devices).

Neuromodulation (Operating Unit)

The Neuromodulation division/Operating Unit works to develop, manufacture, and market interventional products (Kyphon Balloon system, Kyphon Assist system, OsteoCool RF Tumor ablation system), spinal cord stimulation systems, brain modulation products, and implantable drug infusion systems to treat patients who suffer from symptoms of chronic pain (SynchroMed II Implantable Infusion System). In the area of spinal cord stimulation products, those working in this division/operating unit endeavor to provide a treatment to patients diagnosed with various forms of chronic pain. These offerings include SureScan MRI Technology, DTM (differential target multiplexed) proprietary waveform, the Intellis Spinal Cord Stimulation System, and the RestoreSensore (rechargeable) SureScan MRI neurostimulation system. Brain modulation products are intended to treat those suffering from symptoms of Parkinson's disease, essential tumor, refractory epilepsy, and treatment-resistant obsessive-compulsive disorder (the Medtronic family of Activa Neurotransmitters, Percept PC Neurostimulator DBS system with BrainSense technology), and Medtronic's Accurian nerve ablation system is a regimen for patients who may benefit from nerve tissue radio frequency ablation treatment.

Note 4:

Diabetes Portfolio: additional product information

In the company's most recent annual report, management writes that the continued growth in international (ie, non-U.S.) sales of their MiniMed 780G insulin pump system during fiscal year 2022 partially offset declines in the diabetes division's U.S. sales (which, of course, didn't include the 780G). The company's most recent annual report was published on their website on June 23, 2022. At that time, the company indicated they felt positive about the demand for the MiniMed 770G system, and when reading between the lines, this statement infers a cautious optimism about the FDA's opinion on the 780G. In the most recent Form 10-Q for the quarterly period ended January 27, 2023, published on Medtronic's website on May 1, 2023, the company emphasizes their belief in the strength of the "continued acceptance and growth internationally" for the MiniMed 780G.^{aa}

^{aa} Form 10-Q, Q1 2023, pp. 65/85.



Earlier this year, Ali Dianaty VP of Product Innovation in the company’s diabetes segment, said in an interview that Medtronic has “got a lot of technology that’s right behind 780G,”^{bb} in reference to the company’s intense focus on the lifting of the FDA warning letter. These efforts have paid off. The products in the pipeline mentioned by Dianaty include a continuous glucose monitoring system (Simplera) and doubling-down on efforts to drive patient access to the Medtronic Extended Infusion set. According to Dianaty, Medtronic is committed to helping this population and over the long term the company is focused on “optimizing our presence across channels and improving the simplicity of our therapy through our future pipeline.”^{cc}

Medtronic Acquisitions, 2015-2022

^{bb} <https://www.medtechdive.com/news/diabetes-technology-leaders-medtronic-tandem-dexcom-abbott-MDT-DXCM-TNDM-ABT-2023/640864/>

^{cc} <https://www.medtechdive.com/news/diabetes-technology-leaders-medtronic-tandem-dexcom-abbott-MDT-DXCM-TNDM-ABT-2023/640864/>



Medtronic Acquisitions 2015-2022					
Year	Month	Company	Value (\$ mm)	Product Description	U.S. State/Nation
2014	January	TYRX, Inc.	160	Products cover a broad range of resorbable materials and drug delivery technology	New Jersey (associated with Rutgers)
	May	Corventis	150	Wireless technologies products for cardiac diseases	California
	June	Covidien plc	42,900	Global healthcare technology and medical supplies provider	Ireland
	August	Sapiens Steering Brain Stimulation GmbH	200	Deep Brain Stimulation (DBS) for patients suffering from Parkinsons disease	Germany
	August	NCG Medical S.p.A.	NA	Broad suite of hospital managed services from infrastructure design and turnkey installation to material and equipment	Italy
2015	February	Advanced Uro-Solutions LLC	NA	NURO™ percutaneous tibial nerve stimulation system	Tennessee
	June	Aptus Endosystems, Inc.	110	Advanced technology for endovascular aneurysm repair (EVAR) and thoracic endovascular aneurysm repair (TEVAR)	California
	June	Cariolnsight Technologies, Inc.	93	Mapping of electrical disorders of the heart	Ohio
	July	RF Surgical Systmes, Inc	235	<u>Detection and prevention of retained surgical items (sponge, gauze or towel)</u>	California
	August	Lazarus Effect, Inc.	100	<u>Acute Ischemic stroke products (clot removal)</u>	California
	November	Aircraft Medical Ltd	110	Affordable, handheld high-quality video laryngoscopes (intubation)	United Kingdom
2016	February	Bellco Societa unipers	NA	Therapies and systems for treatment of renal failure, multiple organ failure, and sepsis	Italy
	June	HeartWare International Inc	1,100 (4.2x revenue)	Treatments for patients with heart failure	Massachusetts
2017	December	Crospon Ltd.	45	Endoscopic diagnostics (minimally invasive swallow testing devices)	California
2018	September	Mazor Robotics Ltd	1,640	Robotic guidance systems for spine and brain surgeries	Israel
	November	Nutrino, Inc	NA	Nutrition-related data services, analytics, and technologies	Israel

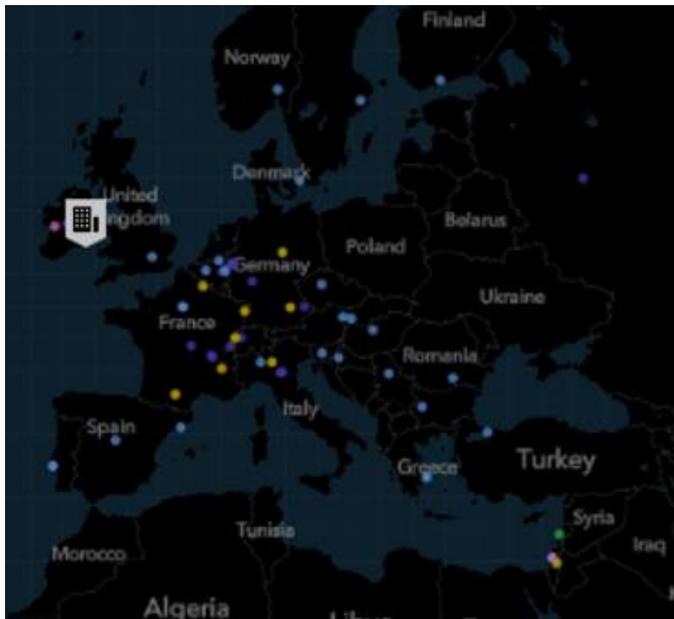


2019	January	EPIX Therapeutics, Inc	NA	Novel cardiac ablation systems for treatment of patients with cardiac arrhythmias including atrial fibrillation (AF)	California
	May	Titan Spine LLC	NA	Design and manufacture of interbody fusion devices for the spine	Wisconsin
	December	Klue, Inc	NA	Food consumption behavior tracking software	Canada
2020	January	Stimgenics LLC	NA	Pioneered a novel spinal cord stimulation (SCS) waveform, Differential Target Multiplexed (DTM™)	Illinois
2021	February	Digital Surgery	NA	Surgical AI, data and analytics, and digital education and training	United Kingdom
	July	Medicrea International SA	NA	Manufacturer and distributor of more than 30 510(k) cleared implant technologies, used in over 175,000 spinal surgeries	France
	September	Avenu Medical, Inc	NA	Endovascular (minimally invasive) creation of arteriovenous (AV) fistulae for patients with end-stage renal disease (ESRD) undergoing dialysis	California
	August	Intersect ENT	1,100 (13.6x revenue)	ENT conditions	California
2022	January	Affer	NA	Cardiac arrhythmia treatment	Massachusetts

Global Positioning (source: Bloomberg)

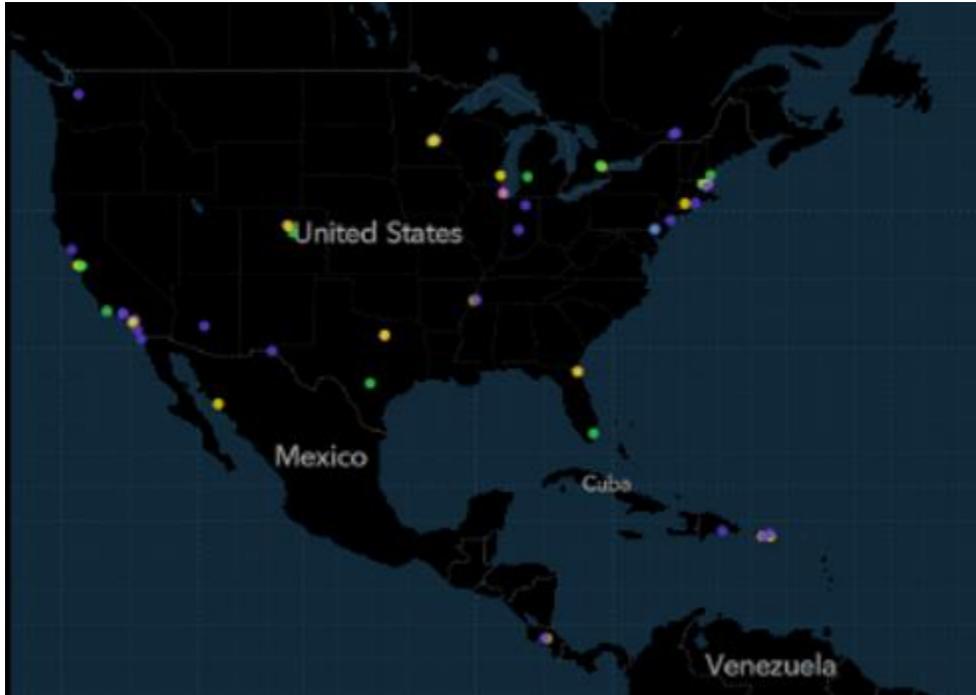


Europe/ME:

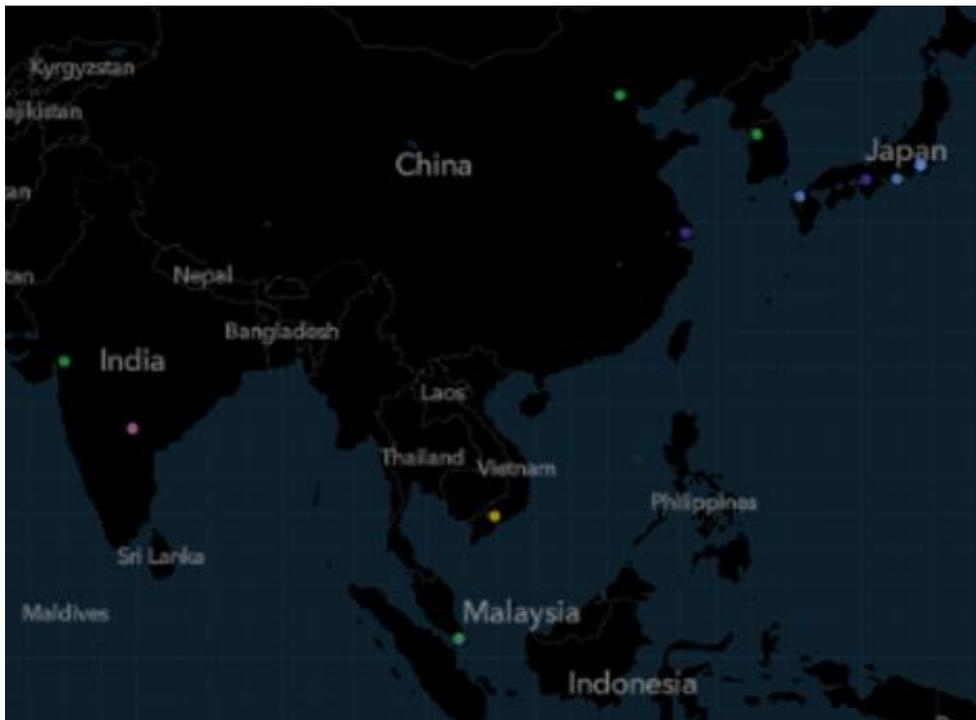




Americas:



Asia:





Medtronic Company Timeline

1949: Company founded by Earl Bakken and his brother-in-law Palmer Hermundslie.

1957: First prototype of battery powered external pacemaker built by Bakken, company incorporates

1959: First shares issued

1960: Bakken and Hermundslie partner with the inventors of the first implantable pacemaker to market and sell the device (which was based on Bakken's 1957 prototype). Mission developed; company employs 14 sales representatives

1962: Medicare introduced by President Johnson, providing a solution to the cost question

1964: Stock listed on NASDAQ

1969: Establishes International division

1970s: Medtronic begins expansion of its product portfolio

1975: Establishes Neurological Division

1977: Establishes Heart Valves division; stock listed on NYSE under ticker MDT

1979: Bakken Society established to honor scientists and engineers who have made significant contributions to the field of surgical and medical devices

1981: Introduces the world's first implantable, programmable drug pump for cancer pain

1985 – Winston Wallin becomes CEO, expanding R&D and diversification efforts; company joins Fortune 500 with \$370m in sales

1986: Acquires Vitatron, a Dutch pacemaker company

1987: Acquires Johnson & Johnson cardiovascular division



1990s: Thanks to R&D expenditures over \$100m/annually, the company broadens its scope to develop products and therapies intended to treat chronic conditions such as diabetes, movement disorders, and spinal conditions

1990s: European headquarters moved from Paris to Tolochenaz, Switzerland, and Asian headquarters moved to Singapore.

1990: Becomes one of the largest companies in the U.S., expanding globally; acquires Bio-Medicus

1991: Bill George becomes CEO

1994: Bakken steps down as chairman

1997: A deep brain stimulator developed to help treat essential tremor symptoms is introduced

1998: Acquires spinal specialists Sofamar Danek, doubling in size

1999: The company celebrates 50th anniversary; introduces its sacral nerve stimulator; acquires Xomed

2001: Art Collins becomes new CEO; company opens new U.S. headquarters in Minneapolis suburb Fridley, Minnesota

2002: Introduces the first remote monitoring system

2007: Introduces the first cervical spine artificial disc

2008: William A. Hawkins becomes CEO

2000: Acquires MiniMed, VidaMed, Kypohon, CryoCath, Ablation Frontiers, and CoreValve LLC

2010: First transcatheter heart valve is introduced; acquires Invatec; Medtronic now operates 300 production and manufacturing facilities, offices and administration facilities, research centers and education centers in over 120 countries.

2011: Omar Ishrak becomes CEO

2010s: The company acquires a large number of companies including Bellco, Titan Spine, Mazor X Stealth Edition systems, as well as the milestone acquisition of Covidien in 2015 which virtually doubles the company in size⁵²



2016: Introduces Micra, the world's smallest pacemaker (implantable directly into the heart); opens Medtronic Labs

2017: Medtronic ranked the largest medtech company with revenues of \$29.7 billion

2020: CEO Omar Ishrak retires, remaining executive chairman until December 2020; Geoff Martha becomes CEO

2022: Company announces plans to acquire Affera, Inc.

PRODUCTS BY MEDTRONIC – CARDIOVASCULAR

CATEGORY	PRODUCTS
CARDIAC RHYTHM	<ul style="list-style-type: none"> Ablation Products for Arrhythmias Ablation Products for Atrial Fibrillation Absorbable Antibacterial Envelopes Cardiac Mapping Products Cardiac Monitors Cardiac Resynchronization Therapy (CRT) Systems Electrosurgical Products Implantable Cardiac Defibrillator (ICD) Systems Pacing Systems Managing Your Patients Ventricular Assist Devices (VAD)
CARDIOVASCULAR CARDIAC PRODUCTS	<ul style="list-style-type: none"> Ablation Products — Surgical Aortic Stent Graft Products Blood Management and Diagnostics Cannulae Cardiopulmonary Products Electrosurgical Products Extracorporeal Life Support (ECLS) Heart Valve Replacement <ul style="list-style-type: none"> Surgical Transcatheter Aortic Transcatheter Pulmonary Pediatric Perfusion Products Revascularization Products (Surgical)
VASCULAR PRODUCTS	<ul style="list-style-type: none"> Coronary <ul style="list-style-type: none"> Balloons Catheters Guidewires & Accessories Stents Peripheral Vascular <ul style="list-style-type: none"> Arteriovenous Fistula (AVF) Creation Chronic Total Occlusion Devices Deep Venous Directional Atherectomy Systems Drug-Coated Balloons Embolic Protection Devices



Guidewires
 Infusion Therapy Products
 Intraoperative Monitoring
 Peripheral and Biliary Stents
 Peripheral Embolization
 PTA Balloons
 Snares
 Superficial Vein Products
 Support Catheters

PRODUCTS BY MEDTRONIC – MEDICAL SURGICAL

<u>CATEGORY</u>	<u>PRODUCTS</u>
ADVANCED SURGICAL TECHNOLOGY	Ablation Systems Electrosurgical Hardware Electrosurgical Instruments Smoke Evacuation Systems Ultrasonic Dissection Vessel Sealing
DIGESTIVE & GASTROINTESTINAL	Capsule Endoscopy Products Endoscopic Ultrasound Products Gastric Electrical Stimulation Systems Gastrointestinal Artificial Intelligence Gastrointestinal RF Ablation Products Gastrointestinal Thermosphere™ Ablation Products Hemorrhoid Energy Therapy System Motility Testing Products Reflux Testing Products Sacral Neuromodulation Systems Therapeutic Endoscopy
GENERAL SURGERY	Ablation Systems Electrosurgical Hardware Electrosurgical Instruments Electrosurgical Products



	<p>Gastric Neurostimulation System Hemostasis Hand Instruments & Ligation Devices Hernia Repair Hysteroscopy Systems Lighted Retractors Nerve Monitoring Products OR Safety Sacral Neuromodulation Systems Smoke Evacuation Systems Surgical Stapling Trocars & Access Instruments Ultrasonic Dissection Wound Closure</p>
RENAL CARE	<p>Acute Extracorporeal Therapy Solutions Chronic Dialysis Solutions Dialysis Access & Maintenance Solutions</p>
RESPIRATORY	<p>Interventional Lung Solutions Intubation Mechanical Ventilation Tracheostomy Ventilator Filters</p>
SURGICAL NAVIGATION & IMAGING	<p>Visualization Solutions</p>

PRODUCTS BY MEDTRONIC – NEUROSCIENCE

<u>CATEGORY</u>	<u>PRODUCTS</u>
NEUROLOGICAL	<p>Access & Delivery Products Acute Ischemic Stroke Products Brain Arteriovenous Malformations Embolization Products Cranial Repair Products Cranial Robotics</p>



Critical Care Products
 Deep Brain Stimulation Systems
 Drug Infusion Systems for Chronic Pain
 Drug Infusion Systems for Severe Spasticity
 Hemorrhagic Stroke & Brain Aneurysm Products
 Infection Control Products
 Intrathecal Baclofen Therapy Systems
 Laser Ablation Technology
 Powered Surgical Instruments
 Radiofrequency Ablation Products for Nerve Tissue
 Sacral Neuromodulation Systems
 Shunts
 Spinal Cord Neurostimulation Systems
 Spine Robotics
 Surgical Imaging Systems
 Surgical Navigation Systems

ORAL MAXILLOFACIAL & DENTAL

Bone grafting

SPINAL & ORTHOPAEDIC

Balloon Kyphoplasty
 Bone Grafting
 Cervical Arthroplasty
 Corpectomy Devices
 Drug Infusion Systems for Chronic Pain
 Drug Infusion Systems for Severe Spasticity
 Electrosurgical Products
 Expandable Posterior Interbody Fusion Interbody Devices
 High-Speed Surgical Drills & Tools
 Nucleus Removal Tools
 Patient-Specific Internal Fixation Systems
 Posterior Occipitocervical Upper-Thoracic Reconstructive Systems
 Radiofrequency Ablation System for Bone Tumors
 Spinal Cord Neurostimulation Systems
 Spine Robotics
 Surgical Imaging Systems
 Surgical Navigation Systems
 Tumor Management
 Vertebroplasty



UROLOGICAL

Ablation Systems
Electrosurgical Hardware
Electrosurgical Instruments
Percutaneous Tibial Neuromodulation Systems
Percutaneous Tibial Neuromodulation System for Assisted Living Facilities
Sacral Neuromodulation Systems
Smoke Evacuation Systems
Ultrasonic Dissection
Vessel Sealing

PRODUCTS BY MEDTRONIC – DIABETES

<u>CATEGORY</u>	<u>PRODUCTS</u>
DIABETES	Continuous Glucose Monitoring Systems Data Management Software Infusion Sets Insulin Pump Systems

PRODUCTS BY MEDTRONIC – VARIOUS

<u>CATEGORY</u>	<u>PRODUCTS</u>
PATIENT MONITORING	Brain Monitoring Capnography Monitoring Cerebral/Somatic Oximetry Health Informatics & Monitoring OEM Monitoring Solutions Pulse Oximetry Temperature Management



Bibliography

-
- ¹ Clark, A. (2023, February 21). *Medtronic beat earnings expectations. The stock is rising.* Barrons. <https://www.barrons.com/articles/medtronic-earnings-stock-price-2999ca88>
- ² Marketline. Company Summary: Medtronic. Retrieved from: https://advantage-marketline-com.proxy.libraries.rutgers.edu/Company/Summary/medtronic_inc
- ³ Wang, Debbie S. (Updated Apr 25, 2023). Medtronic: Long-Awaited FDA Approval of 780g Pump Should Return Diabetes Unit to Growth. Morningstar Report. retrieved from: <https://www.morningstar.com/stocks/xnys/mdt/analysis>
- ⁴ *Medtronic receives FDA approval for its next generation Micra leadless pacing systems.* (n.d.). Medtronic News. Retrieved Spring 2023, from: <https://news.medtronic.com/2023-05-01-Medtronic-receives-FDA-approval-for-its-next-generation-Micra-leadless-pacing-systems>
- ⁵ Marketline. (2020). Global Medical Devices Market: Value Chain Analysis.
- ⁶ Henriksson, Matthew. (03/20/23). Medtronic Takes More Disciplined Operating Approach. *Bloomberg Intelligence*.
- ⁷ Shearn, Michael. (2012). *The Investment Checklist.* John Wiley & Sons, Inc. p. 264.
- ⁸ Fedor, Liz. (2021). New Medtronic CEO Maps Out Strategy to Accelerate Innovation. *Twin Cities Business*. Retrieved Spring 2023 from: <https://tcbmag.com/new-medtronic-ceo-maps-out-strategy-to-accelerate-innovation/>
- ⁹ *Wesco financial's Charlie Munger "A lesson on elementary, worldly wisdom as it relates to investment management & business."* (May, 1995). Csinvesting.org. Retrieved Spring 2023 from: <http://csinvesting.org/wp-content/uploads/2014/05/Worldly-Wisdom-by-Munger.pdf>
- ¹⁰ *Medtronic outlines growth strategy at biennial investor day.* (2021). Medtronic News. <https://news.medtronic.com/2020-10-14-Medtronic-Outlines-Growth-Strategy-at-Biennial-Investor-Day>
- ¹¹ *Medtronic to Acquire Covidien for \$42.9 billion in Cash and Stock.* (2014). Medtronic News. <https://news.medtronic.com/2014-06-15-Medtronic-to-Acquire-Covidien-for-42-9-billion-in-Cash-and-Stock>
- ¹² Whalen, J. (2015, September 3). Medtronic revenue boosted by Covidien acquisition. *Wall Street Journal (Eastern Ed.)*. <https://www.wsj.com/articles/medtronic-revenue-boosted-by-covidien-acquisition-1441280741>
- ¹³ Burrus, Monica F. and Martin, James. (2017). The Corporate Inversion of Medtronic Inc. and Covidien PLC. *The Accounting Educators' Journal*, Vol. XXVII, pp. 25-42.
- ¹⁴ Medtronic: A Guide to Tax Inversion. <https://www.sec.gov/Archives/edgar/data/64670/000119312514270634/d756850d425.htm>
- ¹⁵ Park, A. (2023, March 23). *Medtronic combines surgical devices, robotics units in latest phase of corporate slimdown.* Fierce Biotech. <https://www.fiercebiotech.com/medtech/medtronic-combines-surgical-devices-robotics-divisions-latest-phase-corporate-slimdown>



-
- ¹⁶ Park, A. (2023, March 23). *Medtronic combines surgical devices, robotics units in latest phase of corporate slimdown*. Fierce Biotech. <https://www.fiercebiotech.com/medtech/medtronic-combines-surgical-devices-robotics-divisions-latest-phase-corporate-slimdown>
- ¹⁷ Park, A. (2023a, March 22). *Medtronic adds Nvidia's AI to colorectal polyp-spotting software*. Fierce Biotech. <https://www.fiercebiotech.com/medtech/medtronic-adds-nvidias-ai-colorectal-polyp-spotting-software>
- ¹⁸ <https://news.medtronic.com/2020-10-14-Medtronic-Outlines-Growth-Strategy-at-Biennial-Investor-Day>
- ¹⁹ Henriksson, Matthew. (03/20/23). *Medtronic Takes More Disciplined Operating Approach*. *Bloomberg Intelligence*.
- ²⁰ Medtronic. (n.d.). *Value-based healthcare*. Medtronic.com. <https://global.medtronic.com/xg-en/e/response/value-based-healthcare.html>
- ²¹ Medtronic Investor Handout. March 2023.
- ²² Medtronic Investor Handout. March 2023.
- ²³ Jasinski, N. (2023, May 4). *Compass beats expectations despite inventory glut. What the CEO has to say*. Barrons. <https://www.barrons.com/articles/compass-diversified-earnings-stock-price-683ac802>
- ²⁴ *Medical devices market size, share & growth*. (n.d.). Fortunebusinessinsights.com. <https://www.fortunebusinessinsights.com/industry-reports/medical-devices-market-100085>
- ²⁵ Market. Us. (2023, March 1). *Medical devices market size (\$656 bn by 2032 at 3.0% CAGR) globally*. Market.U.S. <https://www.globenewswire.com/en/news-release/2023/03/01/2617891/0/en/Medical-Devices-Market-Size-656-Bn-by-2032-at-3-0-CAGR-Globally-Analysis-by-Market-us.html>
- ²⁶ *Medical Devices Industry in India – market Share, reports, growth & scope*. (n.d.). India Brand Equity Foundation. <https://www.ibef.org/industry/medical-devices>
- ²⁷ Zacks Industry Rank — Medical Products. <https://www.zacks.com/stocks/industry-rank/industry/medical-products-104>
- ²⁸ Nachum, L. (2021). *Global Pandemics and the Economics of Value Chains: COVID-19 and the Production of Medical Devices*. *AIB Insights*, 21(2). retrieved from: <https://insights.aib.world/article/24402-global-pandemics-and-the-economics-of-value-chains-covid-19-and-the-production-of-medical-devices>
- ²⁹ *Risk outlook for the medical device supply chain*. (n.d.). Fticonsulting.com. <https://www.fticonsulting.com/insights/white-papers/looking-ahead-risk-outlook-medical-supply-chain>
- ³⁰ Deloitte.com. <https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/medtech-industry-.html>
- ³¹ *The top 5 trends to watch in the medical device industry*. (n.d.). Meddeviceonline.com. <https://www.meddeviceonline.com/doc/the-top-trends-to-watch-in-the-medical-device-industry-0001>
- ³² *MedTech industry trends: Navigating the future of the medtech industry* (2021, November 3). Deloitte United States. <https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/medtech-industry-trends.html>
- ³³ Broadwith, P. (2016, February 4). *Medical devices consolidation continues*. Chemistry World. <https://www.chemistryworld.com/news/medical-devices-consolidation-continues/9421.article>
- ³⁴ Cha, M., Copp, J., & Pellumbi, G. (2014, September 1). *Value creation in medical device M&A*. Mckinsey.com; McKinsey & Company. <https://www.mckinsey.com/industries/life-sciences/our-insights/value-creation-in-medical-device-m-and-a>



-
- ³⁵ *Factors behind the medical device consolidation frenzy.* (n.d.). Medicaltracking.com.
<http://medicaltracking.com/about/news-updates/factors-behind-the-medical-device-consolidation-frenzy>
- ³⁶ *Impacts of consolidation on the healthcare supply chain.* (n.d.). Definitive Healthcare.
<https://www.definitivehc.com/blog/impacts-of-consolidation-on-the-healthcare-supply-chain>
- ³⁷ *2023 medtech industry outlook.* (n.d.). Rsmus.com. <https://rsmus.com/insights/industries/life-sciences/medtech-trends.html>
- ³⁸ (N.d.-d). Congress.gov. <https://crsreports.congress.gov/product/pdf/R/R47374>
- ³⁹ Medtronic FY2023 Q1 quarterly report
- ⁴⁰ Wang, Debbie S. (Updated Apr 25, 2023). Medtronic: Long-Awaited FDA Approval of 780g Pump Should Return Diabetes Unit to Growth. Morningstar Report. retrieved from:
<https://www.morningstar.com/stocks/xnys/mdt/analysis>
- ⁴¹ Wang, Debbie S. (Updated Apr 25, 2023). Medtronic: Long-Awaited FDA Approval of 780g Pump Should Return Diabetes Unit to Growth. Morningstar Report. retrieved on April 20, 2023 from:
<https://www.morningstar.com/stocks/xnys/mdt/analysis>
- ⁴² Moore, R., & The Motley Fool. (2012, April 30). *How to tell if Medtronic is hiding weakness.* AOL.
<https://www.aol.com/news/2012-04-30-how-to-tell-if-medtronic-is-hiding-weakness.html>
- ⁴³ Why Warren Buffett Dislikes EBITDA - Drawbacks in Valuation. (2017). Corporate Finance Institute.
<https://corporatefinanceinstitute.com/resources/valuation/warren-buffett-ebitda/>
- ⁴⁴ Fajasy. (2021, January 3). *How to use dividend discount models to value dividend stocks.* StableBread.
<https://stablebread.com/how-to-use-dividend-discount-models-to-value-dividend-stocks/>
- ⁴⁵ *Damodaran Online: Home Page for Aswath Damodaran.* (n.d.). Nyu.edu.
<https://pages.stern.nyu.edu/~adamodar/>
- ⁴⁶ Halley, J. (2023, March 1). *Is Medtronic still a great dividend stock?* The Motley Fool.
<https://www.fool.com/investing/2023/03/01/is-medtronic-still-a-great-dividend-stock/>
- ⁴⁷ Larkin, Howard, D. (2022). Cyberscurity Risk for Medtronic Insulin Pump. *The Journal of the American Medical Association*, Vol. 328 (17), p. 1679.
- ⁴⁸ Pedersen, A. (2023, February 22). *China's VBP Regulation Impacts Medtronic Sales.* Mddionline.com.
<https://www.mddionline.com/regulations/chinas-vbp-regulation-impacts-medtronic-sales>
- ⁴⁹ Medtronic hit with \$106.5 mln U.S. verdict in heart-valve patent case. (2023, February 9). *Reuters.*
<https://www.reuters.com/legal/medtronic-hit-with-1065-mln-us-verdict-heart-valve-patent-case-2023-02-09/>
- ⁵⁰ Fernando, J. (2003, November 25). *Price-to-book (PB) ratio: Meaning, formula, and example.* Investopedia. <https://www.investopedia.com/terms/p/price-to-bookratio.asp>
- ⁵¹ Sommer, Jeff. (Sept. 22, 2022). From the Fed? We've Been Here Before. *New York Times.*
- ⁵² Marketline. (2012). Medtronic, Inc.: The journey from electrical repair shop to global medical technology giant; <http://wwwp.medtronic.com/newsroom/content/1281109242470.pdf>;
<https://www.zippia.com/medtronic-careers-30973/history/>