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Wearable Medical Tech and Its Future

A PatSnap Report

Wearable Device Analysis: A Healthcare Revolution

Executive Summary

In 2019, there were more than 722 million wearable devices. By the end of this year, that number is expected to meet or exceed one billion. From fitness trackers and body sensors that monitor health and well-being to smart jewelry and clothing, one thing is certain: wearable devices are changing the way in whcih we live.

Wearable medical devices, in particular, are full of innovation. These devices enable users to be proactive about their healthcare, while simultaneously allowing doctors to monitor their patients from afar. This field shows so much promise that tech companies are rushing to patent their wearable device intellectual property (IP), while giant corporations like Microsoft, Apple, and Samsung compete to deliver the latest and greatest devices.

In this report, we explore the IP and innovation trends and shaping the future of wearable technology, including:

- Patent application and grant trends.
- Key players and emerging entrants.
- Investment activity across the industry.

We pulled the visual charts and graphs included in this report from our AI-powered innovation intelligence platforms: Analytics; Discovery; and Insights. These platforms collate disparate data from patent applications, granted patents, technology news, merger and acquisition activity, venture capital investments, and more to connect the dots. We combined these insights with reports from reputable sources to paint a holistic, 360-degree overview of where the industry is now, and where it's heading.

Introduction

Wearable devices, also known as "smart devices," are worn on the body, close to the skin. Examples include smart clothing and jewelry. These devices are built to collect data from daily activities and track it over a set period.

In the US, 30% of adults use wearable devices as a way to monitor health and well-being. From daily steps and heart rate and blood pressure monitoring to sleep pattern tracking and fitness reminders, wearable devices are disrupting the healthcare industry.

This has us wondering: What impact will wearable technology have on healthcare providers and patients?

According to a recent study, the wearable tech industry was valued at approximately $115.8 billion USD in 2021, and is expected to reach a $380.5 billion dollar valuation by 2028. Top wearable tech companies include Apple, Google, Informa, Samsung, and Amazon, to name a few.

Company Name	Tech Topic	Institution Location	Founded Year	No. Of Employees	Company Type
Apple, Inc. www.apple.com NASDAQ: AAPL	Wearable technology, Smart device, Smartwatch, Software, Computer hardware, Peripheral, Electronics, Mobile device, ...[+12]	California, United States	1976	> 100,000	Public Company
Google LLC www.google.com NASDAQ: GOOG	Smart device, Advertising, Enterprise software, Search engine, Blog network, Artificial intelligence, Cloud storage, Query language, ...[+12]	California, United States	1998	10,000-50,000	Subsidiary Company
Informa Plc www.informa.com LON: INF	Publishing, Information technology consulting, Business-to-business, Conference management, Business intelligence, Exhibition, Social science, Business travel, ...[+10]	United Kingdom	1998	5,000-10,000	Public Company
Samsung Electronics Co., Ltd. www.samsung.com KRX: 005930	Computer hardware, Semiconductor, Software, Mobile device, Electronics, Peripheral, Solid-state drive, Electronic component, ...[+12]	South Korea	1969	> 100,000	Public Company
Amazon.com, Inc. amazon.com NASDAQ: AMZN	Smart device, E-commerce, Content creator, Data processing, Transport engineering, Artificial intelligence, Electronic business, Publishing	Washington, United States	1994	> 100,000	Public Company

Wearable Medical Devices: A Landscape Overview

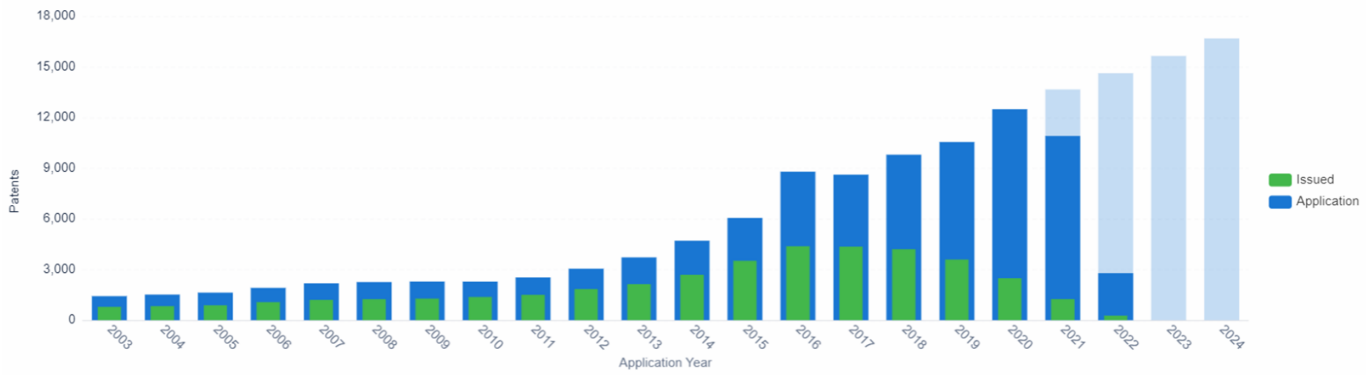
When analyzing IP in the wearable medical technology space, there are many aspects to consider, including:

- Patent legislation as it relates to hardware developments (physical product attributes).
- Software developments (the technology behind the product).
- Current medical device technology capabilities.

Additionally, it's vital for organizations aiming to innovate and succeed in this sector to carry out strategic patent searches. This process mitigates risks associated with possible infringement, and allows companies to validate ideas and identify potential opportunities.

Challenges to Patenting Wearable Medical Technology

The graph below illustrates patent trends as they relate to wearable technology in the healthcare industry. The green lines showcase issued patents, and the dark blue lines represent patent applications; and the light blue lines stand for predicted future application trends.



*Application and Issue Trend, Wearable Technology – Medical devices, PatSnap Insights *Generally, there is an 18-month lag between patent applications until they become granted patents. Therefore, the 2021 and 2022 graphs still depict areas of light blue.*

Since 2016, patent applications related to wearable devices have steadily increased. That said, the industry is still in its infancy and ironing out the kinks, including the jurisdictional laws related to patentability.

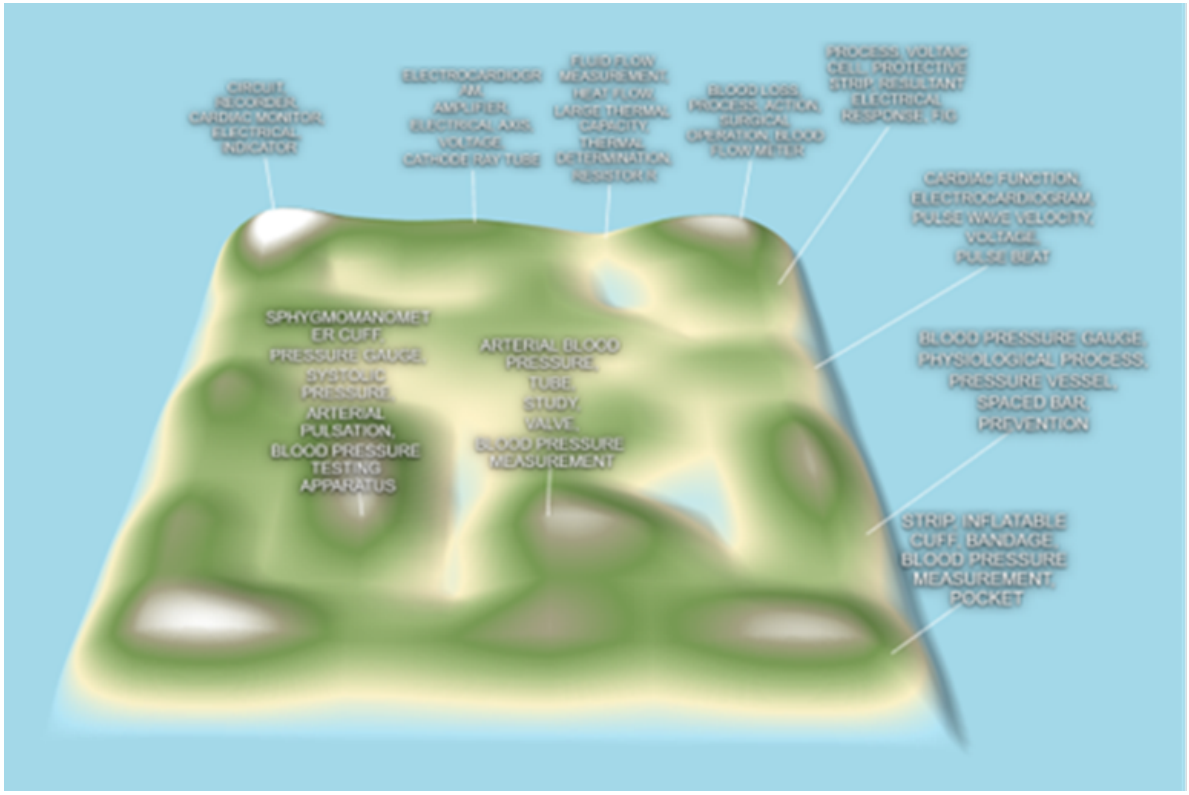
In Europe, the law indicates that wearable devices that fall under "digital health," which means these devices can be patented in a similar fashion as standard medical device technology. However, European law is riddled with hurdles when it comes to getting software-related patents approved. For example, patentable software needs to exhibit a "technical effect." Therefore, if you have a wearable medical device that collects sensor data at unpredicted times, changing the software to obtain this data may make it patentable. Healthcare technology and related innovations must consider various medical exclusions, such as whether they include methods to treat human or animal bodies by surgery, therapy, or other diagnostic practices, as these cannot be patented. Companies can overcome these hurdles by reformulating their patent specifications and connecting them to specific medical uses, as opposed to methods of treatment.

In the US, patent laws related to “digital health” are different. The Supreme Court ruled that “abstract ideas” are not patentable, “inventive concepts” are. As such, digital health inventions may lie within the “abstract idea” umbrella, as far as the Supreme Court is concerned. For example, in one case, the Court of Appeals for the Federal Circuit determined that a patent for a platform that allows medical professionals to connect with patients in real time and transfer health information couldn’t be approved because it’s an abstract idea. Despite this, abstract ideas including an “inventive concept” may be patentable. To be successful, inventors must highlight the technological improvements or practical usage of the abstract idea in question.

Often, it takes as long as two years for a patent to move from the application stage to granted patent. However, this process is further complicated by the US Food and Drug Administration’s (FDA) approval process. These companies also need to obtain approval from regulatory bodies like the FDS and patent offices in order to be able to protect their inventions and commercialize them. To minimize infringement risks during this period, companies may apply for a patent term extension under the Hatch-Waxman Act. This extends the patent’s lifespan by a maximum of five years under circumstances where the patent owner cannot exercise their patent rights due to FDA delays.

The patent term extension must be filed with the United States Patent Trade Office (USPTO) within 60 days of the FDA product application date.

Wearable Medical Devices: Patent Landscape



Patent landscape, Wearable devices – Medical devices, PatSnap Landscape

Above is a topical landscape of the wearable devices within the medical device industry. This landscape points out where patent activity is high, and where it’s low, based on the peaks and troughs. Analyzing trough areas for potential opportunities is a worthwhile investment, as these may indicate future hot spots where companies infiltrate the industry.

As the graph below illustrates, blood pressure and cardiac technology continues to be a focal point for many companies. This makes sense because the technology and sensors already exist, which means it's easier for companies to innovate and make small amendments without reinventing the metaphorical wheel. Additionally, manufacturers are plentiful, making it easier to take an idea from concept to commercialization.

Take Apple as an example. The company plans to make additional developments to its Apple Watch to improve its cardiovascular measuring capabilities. These updates may include allowing wearers to track their blood pressure, which may be a lifesaving addition. In the US alone, high blood pressure affects 108 million people, and leads more than 500,000 deaths annually.

However, implementing these updates isn't a straightforward process. Instead, doing so requires FDA approval, which could take years. But even if these updates are introduced, they may not have the intended impact. Smart watches cost between $100 to $400, and the communities that would benefit the most from these features are mostly low-income households. In order to truly disrupt healthcare - especially as it relates to early illness detection - governments, private companies, and insurance companies need to collaborate to ensure these devices are as accessible as medications for those who need them the most.

Patent/Title	Std. Current Assignee	Simple Family	IPC Scope	Value (USD)	Estimation Lifespan
EP4027234A1 Multi-user intelligent assistance	MICROSOFT TECH LICENSING LLC	76	1	$14,330,000	Expiry data unavailable
EP3092463B1 Smart wearable devices with power consumption and network load optimization	SONY CORPSONY CORP OF AMERICA	111	1	$13,010,000	8yrs Application Expiry
US11424018B2 Physical activity and workout monitor	APPLE INC	68	4	$12,280,000	2yrs Application Expiry
EP3932444A1 Adaptive system for blood fluid removal	MEDTRONIC INC	100	2	$12,060,000	Expiry data unavailable
US20150154679A1 Method and system to create custom, user-specific eyewear	BIS	50	4	$12,050,000	8yrs Application Expiry

Highest Market-Valued Patents, Wearable devices – Medical devices, PatSnap Insights

Key Wearable Device Patents

As patent activity increases, so do startup and technology-based merger and acquisition (M&A) investments.

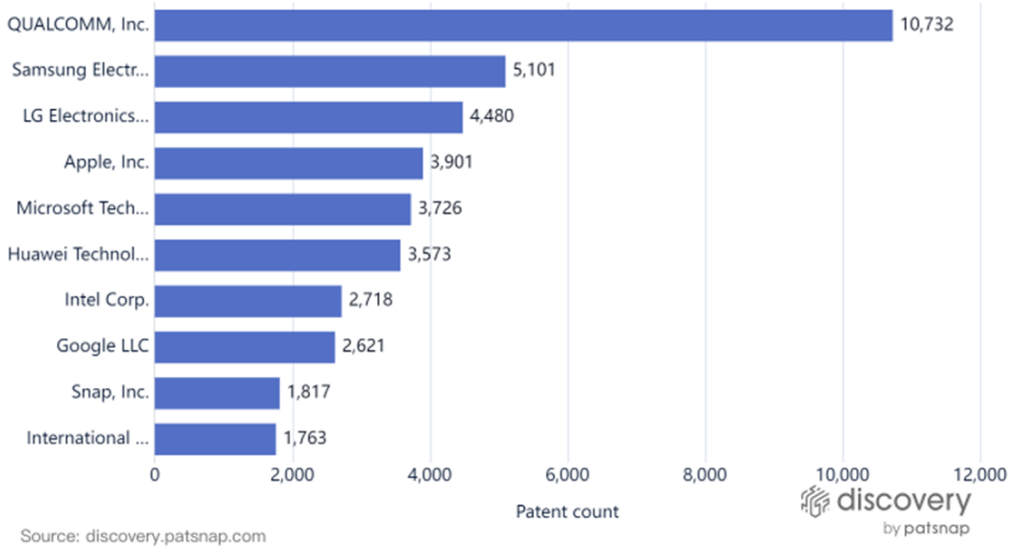
PatSnap's indicator-based patent valuation methodology uses a set of electronically available data and neutralizes it with respect to vendor or buyer interest. It considers more than 80 indicators, carefully chosen by integrating external research sources with our internal research and expertise. We consider all important aspects such as economic value, technology strength, strategic value, and market potential and advantages, as well as legal value. The patent graph on the previous page shows the top five most valuable patents in the wearable devices industry.

Interestingly, Medtronic's patent sits in fourth place, behind big commercial players Microsoft, Sony, and Apple. These companies seem to be applying their technology to adjacent markets with success, leading to valuations of $13,000,000 USD and more. Valuations support strategic decisions and business direction, which are normally advised by IP/legal experts and professionals. Additionally, some patents may be assigned value that tie directly to revenue. For example, patented technology that drives purchases of a specific product and commands a premium price will therefore influence the total valuation of the patent. However, this isn't black and white. Sometimes, a patent's value isn't linked directly to revenue and is measured against other factors like its sucess at keeping competitors at bay.

Painting a Comprehensive Picture of the Medical Device Wearable Industry

As we explained in the previous section, bringing new products to market is challenging in any industry, but especially so in healthcare. Thus, running a patent analysis alone isn't enough, as the top filers may not always be commercial leaders.

Instead, it's necessary to combine patent insights with other leading indicators such as technology news, investment activity, market trends, and more. Together, these data points ensure companies competing in the wearable device space are able to minimize risks associated with infringement and failures, which is why we must turn our attention to innovation activities in the next section.



The fastest growing companies over the five years include: QUALCOMM, Inc.; Samsung Electronics Co.; LG Electronics; Apple Inc., PatSnap Discovery

In the medical device wearable technology sector, traditional "medical device" companies struggle to compete with established tech giants. Although this seems counterintuitive, given many medical device companies such as Johnson & Johnson MedTech and Medtronic are household names, it makes sense. After all, Apple, LG Electronics, Samsung, Qualcomm, and other major players have deep pockets and the expertise necessary to build the software and hardware necessary to produce wearable MedTech devices.

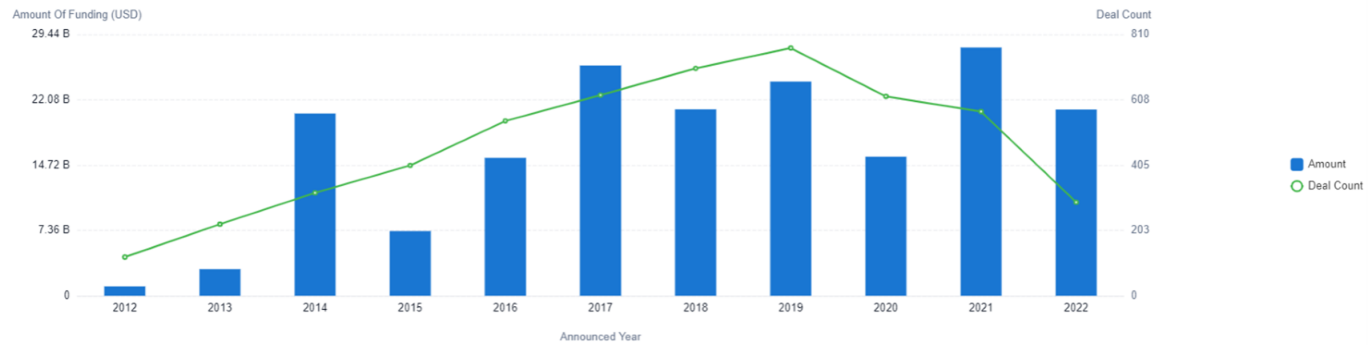
However, innovation is only one side of the coin. These companies also need to get approval from regulatory bodies such as the FDA and patent offices, in order to be able to protect their inventions and commercialize them. With competition increasing by the day, and more money being funneled into research and development than ever before, many organizations are partnering through mergers and acquisitions (M&A). M&A's help to decrease costs, while maximizing impact and efficiency.

A notable example is Softheon, Inc., a New York-based company that recently acquired NextHealth Technologies. NextHealth is an AI-powered, healthcare-based software-as-a-service (SaaS) analytics platform. Its platform is designed to reduce pressure on health care providers for routine processes by enabling users to monitor their daily measurements (such as heart rate and blood pressure).

This acquisition strengthens Softheon's go-to-market strategy, while simultaneously improving its engineering process, leading to more competitive, robust offerings. Combined, these two companies plan to provide more affordable healthcare options to vulnerable populations and improve the overall quality of care by advancing AI in health services.

Although this is one example of many, it illustrates why mergers are an attractive choice for many organizations operating within the medical device wearables industry.

VC Investment Activity in the Wearables Sector



VC Investment Trend Over Time, Wearable devices – Medical devices, PatSnap Discovery

As wearable technology grows in popularity, it attracts more investors. This is particularly evident by looking at data from the past six years, where a notable uptick in patent applications is visible. And the industry isn't expected to slow down anytime soon, with an estimated CAGR of 13.67% between now and 2027.

With an aging population, we can expect to see increased demand for wearable medical devices, particularly as chronic illnesses, like heart disease and diabetes, increase in incidence. According to the World Health Organization (WHO), an estimated 41 million people die each year due to the implications of chronic illnesses. Physical fitness and healthy nutritional habits are key in combating many of the negative externalities associated with these conditions; and wearable devices make it easier for people to monitor their physical activity and food intake and share the data with healthcare providers, often in real time. These industry insights make the wearable medical device industry a worthwhile pursuit for many investors, as there is no shortage of potential customers.

Another attractive aspect to investors is the regulatory approvals in place in in certain jurisdictions, such as those in the U.S. For example, in March 2022, the FDA approved Biobeat's remote patient monitoring device. This device measures respiratory rate, body temperature, cuffless blood pressure, blood oxygen levels, and pulse rate.

Biobeat was granted a 510(k) clearance for this wearable, which means it was signed off by the FDA as a device that demonstrates its "safe, effective, and substantially equivalent to a legally-marketed device." Submitting a 510(k) allows medical device companies, such as Biobeat, to release new products without clinical trials or testing, therefore saving time and money.

Closing Comments

There's no question about it: wearable medical devices are disrupting the healthcare industry. From smart watches and jewelry to clothing and beyond, we can reasonably expect wearable devices to continue growing, especially as the population ages and people become more empowered with their own self-care practices.

However, companies must remain steadfast and strategic in how they approach, and apply for, IP protections. Doing so mitigates the risks of infringement while increasing the likelihood of short- and long-term success. However, organizations will need to properly monitor and analyze patent activity and innovation trends, to use these insights to make informed business decisions.

To learn more about trends shaping wearable medical devices, or other IP or innovation trends, try our AI-powered innovation intelligence platform, Discovery. The subscription is free, and you'll gain instant access to billions of global data points related to investment activity, academic reports, technology news, patents, and more.

Founded in 2007, PatSnap is the company behind the world's leading Connected Innovation Intelligence platform. PatSnap is used by more than 10,000 customers in over 50 countries around the world to access market, technology, and competitive intelligence as well as patent insights needed to take products from ideation to commercialization. Customers are innovators across multiple industry sectors, including agriculture and chemicals, consumer goods, food and beverage, life sciences, automotive, oil and gas, professional services, aviation and aerospace, and education.

PatSnap's team of 1000+ employees work from its global headquarters in Singapore, London, and Toronto. To learn more about how PatSnap breaking barriers to connect innovators with insights, visit www.patsnap.com.

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