Journey from Electronics to Healthcare Technology – Philips, Healthcare Product Maker

Ramanathan G. [1] & S. N. Jagadeesha [2]

[1] Research Scholar, Institute of Computer Science and Information Science, Srinivas University, Mangalore, Karnataka, India,
ORCID-ID: 0000-0001-9621-3294; Email Id: ramanathanmca2006@gmail.com

[2] Research Professor, Institute of Computer Science and Information Science, Srinivas University, Mangalore, Karnataka, India,
ORCID-ID: 0000-0002-5185-2233; Email Id: jagadeesha2012@gmail.com

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[1] Research Scholar, Institute of Computer Science and Information Science, Srinivas University, Mangalore, Karnataka, India,
ORCID: 0000-0001-9621-3294; Email Id:ramanathanmca2006@gmail.com

[2] Research Professor, Institute of Computer Science and Information Science, Srinivas University, Mangalore, Karnataka, India,
ORCID: 0000-0002-5185-2233; Email Id: jagadeesha2012@gmail.com

ABSTRACT

Background/Purpose: *In 1891, Gerard Philips and his father Frederik created the Dutch multinational corporation Philips in Eindhoven. Its headquarters are in Amsterdam. Having divesting off its consumer electronics division, Philips is now focused completely on the health technology industry. The company has extensive experience in a wide range of healthcare-related fields, including cardiology, health technology, oncology, respiratory medicine, fertility and pregnancy. To make people's lives better through innovation, and to contribute to the creation of a world that is both more sustainable and healthier.*

Objective: *This paper provides a case study of Philips' transformation from an electronics firm to a leading healthcare product producer. This paper also looks at the healthcare business as a whole, as well as the many technological advancement components of it.*

Design/Methodology/Approach: *Secondary sources were used in this investigation, including journals and conference publications, annual reports, Philips Company websites, the internet, scholarly articles, and social media reviews. On the company, a SWOT analysis was performed.*

Findings/Results: *The 131-year-old company's growth as an electrical and electronic goods manufacturer has been meritorious. The company has ventured into the healthcare sector after 2010 and has a road ahead to become a pioneer in this sector.*

Conclusion: *Philips Healthcare is a global player in the manufacture of healthcare equipment. The company has a robust R&D division which can aid in building more innovative healthcare products. By being more innovative the company can achieve its mission of improving global health and sustainability through technological advancements.*

Paper Type: *Company analysis as a Research Case Study*

Keywords: Philips, Philips India, Healthcare Industry, Company Analysis, SWOT Analysis, COVID 19, CSR

1. INTRODUCTION :

The 131-year-old Philips Company has evolved from an electronics company into the health care industry. Health care, commonly known as the medical industry, is an economic sector that combines the supply and demand of health care products and services for the treatment of patients. One of the world's largest and most rapidly expanding industries is healthcare. The production and sale of products and services that aid in the preservation and restoration of health are included. In today's healthcare market, services, products, and finance are all important components. The industry can be broken down into various sub-sectors and sub-categories, and it relies on interdisciplinary teams of qualified professionals and paraprofessionals to meet the health needs of individuals and populations. The health care sector is home to a wide variety of product categories. Products used in the health care industry to meet the requirements of patients in terms of their health may be referred to as "health care products." These may include products, devices, chemicals, medications, substances, apparatuses, instrumentalities, or equipment.

There are several different producers of the various pieces of medical equipment. The companies Medtronic, Johnson & Johnson, Abbott, Philips, and GE Healthcare are among the most prominent in the world when it comes to the production of a wide range of medical equipment and other items related to healthcare.

In addition to its principal listing on the Euronext Amsterdam stock exchange, Philips also maintains a secondary listing on the New York Stock Exchange, making it one of the most prominent corporations in the healthcare industry [1]. Gerard Philips, a Jewish entrepreneur from the Netherlands, and his father, Frederik Philips, himself a Jewish entrepreneur, started the Philips Company in 1891. Frederik, a banker headquartered in Zaltbommel, financed the acquisition and setup of an empty factory building in Eindhoven, which is where the company began manufacture of carbon-filament lamps and other electro-technical items in 1892. Since the first carbon-filament light bulb was made in the Netherlands, it is often said that Eindhoven "invented" the light bulb [2].

Starting in 1939, the company made electric razors marketed under the Philishave and Norelco trademarks. After the war, the business pioneered the compact cassette and, with Sony, co-created the compact disc. In terms of revenue generated in 2012, Philips might be considered the industry leader. Philips underwent extensive reorganisation with the ultimate intention of shifting the company's focus from electronics to healthcare. It was especially noticeable after 2011 when Frans van Houten was hired as CEO. The success of Philips in the 2010s can be attributed in part to the company's new health and medical strategy [1]. "Innovation and You" is the slogan of Philips.

In order to provide comprehensive solutions, Philips makes use of cutting-edge technology as well as extensive clinical and consumer data. The company has become a frontrunner in a number of different fields related to healthcare, including diagnostic imaging, image-guided therapy, patient monitoring, and health informatics, in addition to consumer health and home care. The company has also emerged as a frontrunner in the field of image-guided therapy. From healthy living and prevention to diagnosis, treatment, and home care, Royal Philips of the Netherlands is a pioneering health technology firm dedicated to enhancing the quality of life for its customers and delivering better health outcomes. Philips India Limited, a wholly-owned subsidiary of the Dutch conglomerate Royal Philips, is dedicated to enhancing the health and well-being of its customers [3].

2. LITERATURE SURVEY:

The following Table 1 shows the various journals and articles published regarding medical equipment industry, Healthcare Industry, Philips company, Philips Healthcare as well as the study's area. The table lists various journals published between 2003 and 2021. The listed articles have been taken from Google Scholar.

Table 1: Scholarly literature on Philips, Healthcare Industry

S. No.	Field of Research	Focus	Outcome	Reference
1	Medical Equipment Industry	Sustainability of Medical Equipment	Standards and Guidelines for Sustainability	Elabed et al., (2019). [4]
2	Maintenance of Medical Equipment	Expectations of the Customer in regard to Remote Maintenance of Medical Equipment	Customers demand personal engagement, integration, and individualization, not just high-tech offerings, to improve their utilization.	Paluch, S. (2014). [6]
3	Radical Innovation	Contribution of users to radical innovation in medical equipment industry	Users have a significant impact on the medical equipment industry's radical innovation.	Lettl et al., (2006). [7]

4	Innovation in Medical Equipment	Role of User - Manufacturer Interaction in Medical Equipment Innovation	Effective innovation management and the identification of new research topics	Shaw, B. (1985). [5]
5	Life span of Medical Equipment	Impact of maintenance on Medical Equipment Durability	Preventive maintenance (PM) on medical equipment impacts the survival of equipment.	Khalaf et al., (2013). [8]
6	Philips Industrial Network	The History of Philips	The co-evolution of industrial network and infrastructural networks is investigated at the local, national, and global levels.	Mila Davids (2004). [9]
7	Corporate Sustainability Innovation Strategy	Royal Philips Electronics and the Green Flagship Program for Sustainability	Focusing on sustainability as a goal, together with procedures and initiatives, can boost the impact of sustainability innovations.	Arnold et al., (2010). [10]
8	Embedding Research Lab in a company – Key factors	Analyzing General Electric (GE) and Philips	An industrial research department's historical analysis requires appropriate leadership and company-wide integration.	Kees Boersma (2003). [11]
9	IT Transformation of Royal Philips	Analysis of business complexity and role of IT in Philips' Transformation	Designing and aligning multiple enterprise pieces to balance local and global size. Philips' innovative digital platforms and business-IT partnership methods.	Mocker et al., (2015). [12]
10	AI Technology in Healthcare Industry	AI-based healthcare applications and their current state including opportunities and challenges	AI applications are transforming not only diagnosis and therapy, but also patients' lifestyles.	Lee D et al., (2021). [13]

3. RESEARCH GAP :

The 131-year-old Philips Group was an early innovator in the production of consumer electronics. Since 2010, the company has expanded into the healthcare equipment manufacturing sector. The company's growth in the healthcare industry is sluggish, despite the strength of its research and development department, which aids in the creation of new technologies and the implementation of concepts that bring value. The purpose of this case study is to gain an awareness of the real difficulties encountered

by the company in the healthcare industry and to locate the obstacles that prevent the organization from expanding.

4. RESEARCH AGENDA :

(1) Comprehend the Philips Group's transformation from an electrical and electronic firm into a healthcare equipment provider.
(2) Recognize the company's most serious vulnerabilities and potential dangers by studying the company's main competitors.
(3) Provide recommendations for the company's continued success in the healthcare market.

5. OBJECTIVES OF THE STUDY :

(1) To understand the growth story of the most successful company into the healthcare industry – Philips Limited.
(2) To discuss the various products, services and solutions of Philips Limited in healthcare industry.
(3) To study its effort on attaining Industry sustainability with innovation.
(4) To report the financial status of Philips Limited.
(5) To comprehend Philips' contribution to the healthcare industry.
(6) Conduct a SWOT analysis and suggest recommendations.
(7) To discuss the role of Artificial Intelligence in healthcare industry.

6. RESEARCH METHODOLOGY OF THE STUDY :

Secondary sources, such as journal and conference publications, annual reports, Philips Company websites, the Internet, academic articles, and social media reviews, were used to conduct this research. Analyses of strengths, weaknesses, opportunities, and threats were carried out. Google Scholar and ResearchGate are also employed to gather data for the current research.

7. GROWTH AND SUCCESS STORY OF PHILIPS LIMITED :

Philips Limited has its operations in around 100 countries across the world. Philips has 111 manufacturing plants, 59 R&D centers, and sales and service operations in 26 countries by the end of 2013. The company employs more than 80,000 across the world. By 2020, the revenue of the company is about 19.5 billion Euros. The market capital of Philips India is INR 577 Crores in 2022 [14]. The growth story of Philips Limited has been discussed in Table 2.

Table 2: Growth of Philips Limited

Year	Milestones
1891	Frederik Philips and his son Gerard established Philips & Co in Eindhoven, Netherlands [15].
1892	The first carbon-filament lamps and other electro-technical items were manufactured in a plant in Eindhoven, where the firm was founded. [2].
1895 – 1920	1985 - Gerard's younger brother Anton was brought in by Philips. 1908 - The Philips Metal Filament Lamp Factory Ltd. (Philips Metaalgloeilampfabriek N.V.) was established in Eindhoven. 1912 - Philips Lightbulb Factories Ltd. (Philips Gloeilampenfabrieken N.V.) was established. 1914 - The original Philips research facility, simply called "Philips Nat Lab," was established [15].
1921 – 1929	Early 1920s - After initially producing vacuum tubes, the company branched out into other product lines. 1927 - Philips' PCJJ, a new shortwave radio station, had just gone live (later PCJ). 1928 - The global initiative The Happy Station show, hosted by Eddie Startz on Sundays, quickly became the longest-running shortwave program in history. 1929 – A new partner, Philips Omroep Holland-Indi, joined PCJJ (later PHI).
1930 – 1944	Early 1930s - Philips debuted a new radio model called the "Chapel" that had an integrated speaker. Philips investigated the Stirling Engine to develop a small, portable generator for its radios to use in areas without access to grid power.

	1939 – The Philishave, an electric razor manufactured by Philips, was released (marketed in the US using the Norelco brand name) [2].
1945 – 1971	1949 – Philips began selling television sets. 1962 – PolyGram expanded its roster to include the newly founded Philips Records. 1963 – Philips's introduction of the audio cassette, the Compact Cassette, was an instant hit. Philips marketed the first portable radio/cassette recorder hybrid, called a "radio recorder," to the public [2].
1972 – 1999	1972 – Philips introduced the N1500, the first consumer VCR. Philips and MCA Inc. introduced the first commercial LaserDisc standard and players. 1982 – Philips and Sony introduced the Compact Disc, which became the CD-R and CD-RW. 1991 – N.V. Philips Gloeilampenfabrieken changed its name to Philips Electronics N.V. 1997 – The DVD format was co-created by Philips and Sony. 1998 - With its Semiconductors division headquartered in Silicon Valley, Philips established the Emerging Businesses group.
2000 – 2005	2000 – Sonicare electric toothbrush manufacturer Optiva Corporation was purchased by Philips and rebranded as Philips Oral Healthcare. 2001 – Agilent Technologies Healthcare Solutions Group was purchased by Philips. Together with LG, Philips established the computer monitor joint venture LG. Displays by Philips. 2004 – Philips' previous slogan, "Let's make things better," has been replaced with "Sense and Simplicity." [2].
2006 – 2009	2006 – Philips' biggest step toward entering the consumer health market was the acquisition of Lifeline Systems. 2007 – To support their Medical Informatics Division, Philips purchased Ximis Inc. From TPL Group, Philips acquired a license for the Moore Microprocessor Patent Portfolio. A firm agreement was announced by Philips and Respironics Inc. 2008 – For the purpose of using Telemedicine from a centralized facility to monitor and care for ICU patients, VISICU, the innovator of the eICU idea, was acquired by Philips.
2010 – till date	2011 – A producer of luminaries with LED technology, Optimum Lighting, was purchased by Philips. Sectra Mamea AB, Sectra AB's mammography division, was purchased by Philips. Philips developed a new health and medical strategy and switched its focus from electronics to healthcare. 2013 - Philips changed its name from Philips Electronics to Royal Philips N.V. and revealed its new tagline, "Innovation and You." 2014 - The lighting business would be split off from the healthcare and consumer lifestyle divisions as part of Philips' plan to divide the firm into two. 2015 - In order to improve its position in non-invasive surgery and imaging, Philips purchased Volcano Corporation. 2017 - In order to grow its present image-guided therapy business, Philips stated it will buy Spectranetics Corp, a company that makes equipment to treat cardiac disease and is situated in the US. With a health technology venture fund as its primary emphasis, Philips founded Philips Ventures. 2019 - Philips stated that it was buying Carestream Health Inc.'s Healthcare Information Systems division.

	2020 - Intact Vascular, Inc., a company established in the United States that creates medical devices for minimally invasive peripheral vascular operations, was purchased by Philips. A leading American provider of remote cardiac diagnosis and monitoring, BioTelemetry, Inc., and Philips agreed into a merger agreement. 2021 - Capsule Technology, Inc., a provider of data technologies and medical device integration for hospitals and healthcare organizations, was purchased by Philips. To diversify its offering of cardiac diagnostics and monitoring, Philips purchased Cardiologs, a developer of AI-powered cardiac diagnostic technology [2].

8. PHILIPS PRODUCTS AND SERVICES :

Philips is a major manufacturer of consumer electrical and electronic products. It is also a top producer of medical supplies. The company's products are categorized into the following groups:
(1) Consumer Electrical and Electronic Products - The following categories represent the wide range of electrical and electronic items that the company produces:
(a) Sound and Vision – The company produces a wide range of items within this category, including televisions, monitors, projectors, media players, home audio systems, soundbars, headphones, wireless speakers, mobile phones, tablets, and mobile and computer peripherals.
(b) Personal Care - Personal Care products of the company include Face Shavers, Beard Trimmers, Hair Straighteners, Hair Straightening brush, Electric toothbrush, Toothbrush heads, Air floss.
(c) Household Products – Numerous kitchen appliances, including coffee makers, electric kettles, rice cookers, induction stovetops, air fryers, grills, toasters, and sandwich makers are produced by the company. The company also manufactures various household goods like vacuum cleaners, electric irons, garment steamers, and air purifiers.
(d) Lighting – Light bulbs being the first product of the company, there has been a great innovation in the lighting front and a variety of lighting related products are manufactured by the company ranging from simple home lamps to LED lights. The company also provides Lighting solutions to consumers and professionals. A few of the lighting products are bulbs, lamps, lighting strips and all accessories required for lighting solutions.
(e) Automotive – The company is a major manufacturer of Automotive lights such as lights, halogens, LEDs for cars and motorcycles. They also manufacture air purifiers for cars.

(2) Healthcare Products - The company manufactures healthcare products in the following categories:
(a) Imaging Systems – The business makes X-ray wires and catheters for the heart and veins, computer tomography (CT) equipment, fluoroscopy equipment, mobile C-arms, mammography equipment, nuclear imaging equipment, positron emission tomography (PET) equipment, radiography X-ray equipment, radiation oncology systems, ultrasound scanners, and ventilators.
(b) Diagnostic monitoring – As part of the Diagnostic monitoring, the company manufactures Cardiographs, Stress testing equipment, ECG adapters cables and leads.
(c) Defibrillators – The company manufactures Defibrillators, accessories required and the required software.

(3) Healthcare Solutions – The following Healthcare solutions are provided by Philips. The following products use Machine Learning techniques.
(a) Alarm Management - The Alarm Management system can be set up to notify care takers when a set of vital indicators are reached and to be silent in the case of non-actionable occurrences.
(b) Early Warning Scoring - Designing a clinical setting with Philips Ambient Experience will enhance the experience of both patients and staff. The solution helps create a welcoming, interesting environment that improves the standard of care.
(c) HealthSuite Digital Platform - The digital Philips HealthSuite platform encourages open and cooperative innovation with a focus on creating ground-breaking health, wellness, and life science solutions that will revolutionize the way care is provided. The company enables new forms of interaction, useful insights, and improved health outcomes by linking devices, accessing data, and

encouraging cooperation. The Platform raises the bar for cloud computing in the healthcare and life science industries [43].

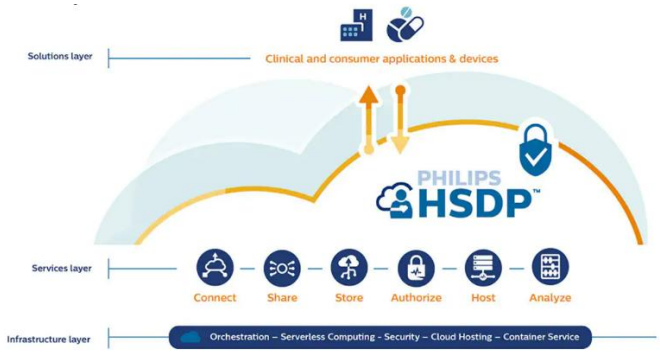

Fig 1: Philips HealthSuite Digital Platform (Source: Philips.co.in)

(d) Integrated Cardiovascular Solution - The clinical, operational, and financial performance of the cardiology department is improved through the Integrated Cardiovascular Solutions' partnerships with healthcare companies [44].
(4) Ongoing partnerships have already demonstrated the effects it can have on:

Fig 2: Philips Integrated Cardiovascular Solutions (Source: Philips.co.in)

(a) Managed Technology Services - Managed Services are an all-inclusive, vendor-neutral solution created to assist and direct in achieving optimal business results. This approach is intended to deal with the growing need for clinical services, the increased regulatory pressure to enhance patient outcomes and quality, as well as the ability to manage capital investment constraints and ageing medical equipment.
(b) Patient Reported Outcomes - With validated questionnaires, QuestLink is a digital solution for gathering, processing, and analyzing outcome data, such as patient reported outcomes and clinical data, inside a healthcare organization. Results provide pertinent information for collaborative decision-making in the doctor's office and support value-based treatment. Machine learning techniques are used in the solution to process the data gathered.
(c) Performance Bridge – Performance Bridge equips hospitals with a flexible array of services to promote continuous improvement, offering a way to uncover and take advantage of opportunities to accomplish more with fewer resources while keeping the patient experience in mind [45].

Fig 3: Philips Performance Bridge (Source: Philips.co.in)

With over 125 years of expertise in innovation and market leadership in the Cardiovascular industry, Philips is a world leader in health technology [16][17].

9. ATTAINING INDUSTRIAL SUSTAINABILITY :

Philips's mission is to improve global health and sustainability through technological advancements. By 2025, the corporation hopes to have made a positive impact on the lives of three billion people worldwide annually. To make this goal a reality, the firm has created the EcoVision Program. As part of this project, Philips takes action on climate change, pioneers the transition to a circular economy, incorporates EcoDesign into their products, and collaborates with suppliers to reduce their environmental impact. The company's stated mission is to "improve the health and well-being of employees, provide the best place to work, and actively engage with suppliers and the communities in which they operate in order to deliver social impact." Philips is committed to the research and development of Green Technologies and to empowering consumers to make positive, everyday contributions to a more sustainable future. The company is committed to minimizing the negative effects of its operations on the environment and maintaining vibrant ecosystems. Consumers in India can easily recycle their old, broken, or unused Philips devices by leaving them off at designated drop-off points [18] [19].

10. TEN MAJOR COMPETITORS :

Philips is a Dutch conglomerate which is a global leader in the manufacture of consumer electric and electronic products. The company has evolved into a leading global player in the manufacture of medical equipment and provider of healthcare solutions. The company operates across 26 countries and has 59 R&D facilities. Table 3 lists the top 10 competitors of Philips Limited in the healthcare sector [20].

Table 3: Top Competitors of Philips Ltd.

S. No	Company Name	Company Description
1	**Johnson & Johnson**	Johnson & Johnson (J&J), an American multinational corporation with its headquarters in New Brunswick, New Jersey, was founded in 1886 and is known for producing consumer packaged products, pharmaceuticals, and medical equipment. A total of 250 of the company's spin-offs operate in 60 different nations, while the firm's wares are exported to over 175 different nations. Johnson & Johnson manufactures a wide range of well-known pharmaceutical and first aid brands. Band-Aid bandages, Tylenol painkillers, Johnson's Baby products, Neutrogena skincare goods, Clean & Clear face cleansers, and Acuvue contact lenses are just a few of its well-known brands. The pharmaceutical business of Johnson & Johnson is called Janssen Pharmaceuticals [21].
2	**GE Healthcare**	General Electric, an American multinational corporation with headquarters in Chicago, Illinois, and New York as its founding cities, has a division called GE Healthcare. In terms of imaging modalities utilized in medical imaging procedures as of 2017, it manufactures and distributes radiopharmaceuticals and diagnostic imaging agents. It manufactures CT imaging machines and other medical diagnostic equipment, supplies the dyes required for magnetic resonance imaging procedures, and develops health technology for medical imaging, information technology, patient monitoring systems, disease research, drug discovery, and biopharmaceutical production. Since its establishment in 1994, it has expanded to operate in more than 100 countries [22].
3	**Siemens Healthcare**	Siemens Healthineers AG is a German manufacturer of medical equipment. It is the parent firm of several medical technology companies and has its main office in Erlangen, Germany. Together with his family, Werner von Siemens co-founded the business in 1847 as a small enterprise in Berlin. It's important to note that Siemens Healthineers is a subsidiary of Siemens AG. Siemens Healthineers is a multinational corporation that employs over 65,000 people throughout the world [23].

4	**Medtronic**	The Irish headquarters of the American medical equipment manufacturer Medtronic plc. The corporation has its main base of operations in the USA. Minnesota, USA is home to Medtronic's administrative and management headquarters. In 1949, Earl Bakken and Palmer Hermundslie opened a repair firm in Minneapolis and named it Medtronic. More than 90 thousand employees are employed by the firm [24].
5	**Cardinal Health**	Cardinal Health, Inc., a multinational provider of healthcare services based in the United States, is the 14th-largest revenue-producing company in the country. The company has offices in Dublin, Ohio and Dublin, Ireland, respectively (EMEA). The business, which specializes in the distribution of drugs and medical supplies, services more than 100,000 venues. Other medical and surgical products produced by the company include gloves, surgical attire, and fluid management instruments. In addition, its radiopharmacy network is among the largest in the United States. Over 75% of American hospitals rely on Cardinal Health for their supply of medical supplies. Roughly 48000 employees are under the company's employ [25].
6	**Baxter International**	Baxter International Inc. is a worldwide healthcare business with headquarters in Deerfield, Illinois. The company's main focus is on creating products to treat renal disease as well as other acute and chronic medical conditions. The BioScience business of Baxter develops vaccines, regenerative medicine products, recombinant proteins for the treatment of haemophilia and other bleeding disorders, and plasma-based medications for immunological deficiencies and other chronic and acute blood-related ailments. Baxter's Medical Products business produces peritoneal dialysis and hemodialysis, as well as other products used in the delivery of fluids and medications to patients, inhalational anaesthetics, contract manufacturing services, and other products for the treatment of end-stage kidney disease or irreversible kidney failure. The corporation employs somewhere around 48000 people [26].
7	**Boston Scientific**	Boston Scientific started on June 29, 1979, in Watertown, Massachusetts. In the areas of interventional medicine such radiology, cardiology, neurosurgery, vascular surgery, urology, cancer, endoscopy and gynaecology, Boston Scientific's medical devices are used. The development of the Taxus Stent, a drug-eluting stent used to treat artery stenosis, is one of Boston Scientific's many successes. There are roughly 41 thousand workers under the company's umbrella [27].
8	**Stryker**	The Stryker Corporation, based in Kalamazoo, Michigan, is a business that creates, develops, produces, and sells medical equipment all over the world. In addition to surgical equipment, endoscopic and communications systems, surgical navigation systems, patient handling and emergency medical equipment, neurovascular, neurosurgical, and spinal devices, among other medical device products, Stryker produces implants for use in joint replacement and trauma surgeries. Over a hundred different nations stock Stryker products. Approximately 46,000 employees are working for the company [28].
9	**Becton Dickinson & Co.**	Medical equipment and supplies are produced and sold by BD, an American multinational medical technology firm commonly known as Becton, Dickinson and Company. Within select regions, BD also offers consultancy and analytics. Fairleigh S. Dickinson and Maxwell Becton founded the New Jersey-based company in New York City in 1897. Roughly 75,000 individuals are employed by the firm [29].
10	**Abbott Laboratories**	Abbott Laboratories is a worldwide American company that manufactures medical supplies and services with its headquarters in Abbott Park, Illinois.

		The company was founded in 1888 by Chicago physician Wallace Calvin Abbott to develop branded pharmaceuticals; it today now manufactures and distributes nutritional supplements, diagnostic equipment, and generic copies of branded medications. Abbott India Limited, the corporation's Indian subsidiary, has been operating for more than a century and is now the leading healthcare goods company in India. Pedialyte, Similac, Glucerna, FreeStyle Libre, i-STAT, and MitraClip are just some of the well-known brands produced by the company's medical devices, diagnostics, and nutrition product businesses. About 113,000 individuals are employed by the firm [30].

11. FINANCIAL GROWTH OF THE COMPANY :

The Philips Group's parent business is Philips N.V. The company consolidated its three reporting operations into a collection of companies named Diagnosis & Treatment, which includes companies that deal with enterprise diagnostic informatics, ultrasound, diagnostic imaging, and image-guided therapy. The Connected Care business is made up of the Monitoring & Analytics, Therapeutic Care, Population Health Management, Sleep & Respiratory Care, and Connected Care Informatics companies. The personal health sector includes oral healthcare, mother and child care, and personal care. Notably, Philips successfully sold its Domestic Appliances division [31].
Table 4 shows the financial growth of Philips Group for the last decade from 2012-2021. Following Fig 4 represents Philips Group's annual gross profit from 2009 to 2021 [32-33].

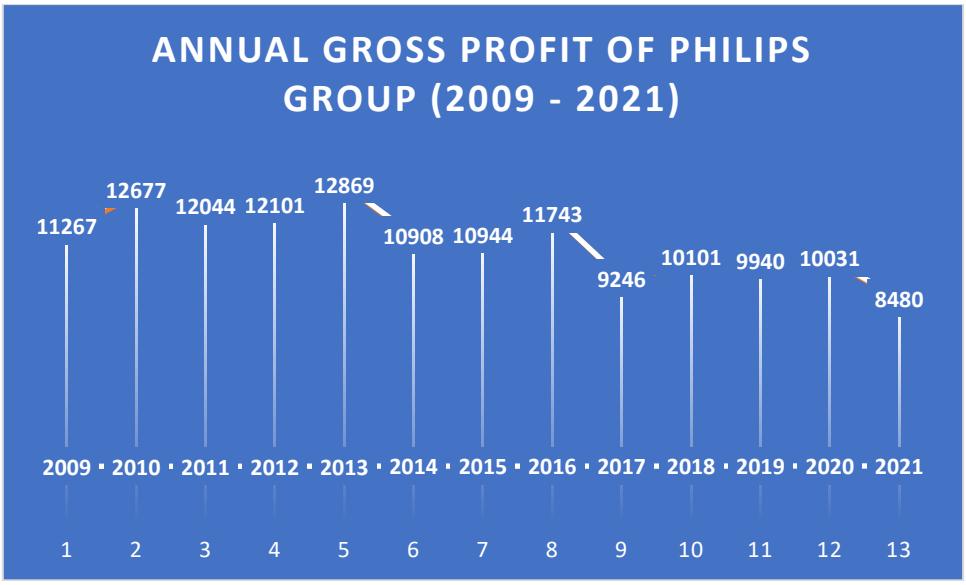

Fig 4: Philips Group's Annual Gross Profit from 2009 to 2021

Table 4: 10 – Year Financial Highlights of Philips Group (Source: macrotrends.net)

	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Income Statement (Millions of USD)										
Revenue	20297	22315	21820	21401	20097	27129	26921	28435	30988	31880
Cost of Goods sold	11817	12284	11880	11300	10851	15386	15976	17527	18119	19779
Gross Profit	8480	10031	9940	10101	9246	11743	10944	10908	12869	12101
Operating Expenses	19643	20553	19977	19372	18382	25047	25819	27789	28343	30555

Operating Income	654	1761	1842	2029	1715	2083	1102	646	2645	1325
Pre – Tax Income	602	1702	1712	1775	1556	1537	692	246	2206	1008
Income After Taxes	724	1376	1335	1547	1162	1175	426	211	1587	612
Net Income	3927	1356	1307	1287	1873	1602	716	552	1553	291
Share Data in USD										
Basic EPS in USD	4.34	1.50	1.45	1.39	2.01	1.75	0.78	0.59	1.70	0.32
Earnings per share in USD	4.32	1.47	1.43	1.37	1.98	1.73	0.78	0.59	1.69	0.31

12. CSR POLICY OF PHILIPS INDIA LIMITED :

CSR, or corporate social responsibility, is an initiative by companies to better the communities and environments in which they operate. As the world changes, businesses everywhere are being pushed to consider more than just profits when making business decisions [34].
Practically every business and organization nowadays participate in some form of corporate social responsibility (CSR) program as a means to improve society and strengthen their brand.

Philips India Limited (PIL) and its affiliates operate in a number of cities across India [35]. PIL's CSR policy is broadly shaped by considering the following factors:

i. Encourage healthcare program that focus on value.
ii. Increase the number of underserved people who can get medical attention.
iii. Refined, locally applicable technologies can have a significant impact on community health and well-being.
iv. Protect the ecosystem and work to preserve ecological harmony.

PIL's CSR initiatives would lead to value-based healthcare treatments that improve access to treatment for underprivileged populations [35]. The following are some potential inclusions in the scope:

i. Support efforts like study, teaching, and practice that raise healthcare standards and availability.
ii. Help fund program that decrease infant and child mortality.
iii. Assistance with healthcare and associated interventions should be expanded during and after disasters.
iv. Improve understanding of and action against non-communicable diseases.
v. Make a contribution to causes that improve environmental sustainability.
vi. Donate cash to designated CSR accounts established by the federal or state government.

The company has a formal governance process in place to monitor CSR projects. Table 5 provides the details of Philips India Limited's corporate social responsibility initiatives [35].

Table 5: Philips India Limited CSR activities

S. No	CSR Activities	Outcome
1	Common reproductive and mental health disorders to be addressed as part of the RMNCH+A plan to increase health care seeking among mothers and their children in low-resource settings.	Improvement in the health of mother and children.

2	Community members in urban slums and rural areas to obtain basic medical treatment owing to mobile medical vans.	Medical Vans with basic medical treatments.
3	The use of SBCC and m-health tools to combat childhood pneumonia in India, which aims to set a global standard for quality management.	Decrease in occurrences of pneumonia in children.
4	A public education effort on the dangers of pneumonia in young children in states with a high incidence rate could help lower infant mortality.	Creation of more awareness about pneumonia in children.
5	Establishing comprehensive lactation management clinics is one way to improve maternal and infant health indicators within the context of the current healthcare system.	Educating about the benefits of breast feeding.
6	Help deserving students from low-income families pursue higher education by contributing to the Philips Scholarship Program.	Providing scholarship for the deserved students.
7	Produce and evaluate a digitally-enabled, low-cost intervention for stemming the rising tide of Type 2 diabetes.	Creating more awareness about Type 2 Diabetes and reverse the same.
8	Programs that help women improve their skills in the areas of aesthetics and health.	Promoting women empowerment.
9	Medical supplies and instruments donated to public health care facilities for use in COVID-19 case management.	Helping to fight the pandemic COVID -19.
10	Provide medical aid to those affected by the Amphan Cyclone in West Bengal's South 24 Parganas area, Bhadrak District, Odisha's Basudevpur and Chandabali areas	Providing Relief support.

Royal Philips has begun the process of incorporating the principles of the Circular Economy into its operations. The sales model, product design and material composition, information technology and data management, supply loops, strategic sourcing for own operations, and human resources and incentives are the six important areas for integration. The goal of the Circular Economy is to reduce the dependence of economic expansion on diminishing natural resources and ecological systems [54].

13. SWOT ANALYSIS :

The identification of many roadblocks and the discovery of fresh expansion prospects are both aided by analyzing individual and organizational effectiveness [66]. The most common method for evaluating and assessing a company's overall strategic position and environment is the SWOT analysis [67]. Strengths, Weaknesses, Opportunities, and Threats, or SWOT analysis, is a structured planning procedure that looks at these four characteristics of a project or business venture. SWOT analysis is a useful tool for developing business and individual strategies. The SWOT analysis is used to establish strategic business plans by analyzing the internal and external factors affecting an industry. We analyze our personal strengths and weaknesses to determine where we stand. In this context, the external forces are the Opportunities and Threats [42].
Consumer Lifestyle (C.L.), Lighting, and Healthcare are the company's three main divisions. Patient Care & Clinical Informatics, Home Healthcare Solutions, Imaging Systems, and Customer Services make up Philips Healthcare's four divisions [51].

The table 6 shows the SWOT matrix of Philips Healthcare [36] [37] [38] [39] [40] [41].
Table 6: SWOT Analysis of Philips Healthcare

Strength	Weakness
1. Strong Brand Equity and Brand Awareness. 2. Consistently excellent service from current vendors. 3. One of the most crucial pre-implementation steps is design. Top-Notch Quality Products	1. Price of the healthcare products. 2. Weaker distribution network compared to competitors. 3. Premature product release is the failure to get a product to market before the competition.

and Services owing to the strong R&D division of the company. 4. Diverse Product Portfolio of Philips Healthcare - Patient Care and Clinical Informatics, Diagnostic Imaging Systems, Home Healthcare and Customer Services. 5. Forerunners in clinical technology – CT, MRI and ultrasound. 6. Ability to Recruit, Train, and Develop. 7. Broad and deep customer service network across the country of India. 8. Consistent profitability; 2011 revenue of $14.3 billion; R&D expenditures equal to 8% of revenue. 9. Sales in more than 100 countries with operations in 60 countries. 10. The latest on environmental and medical sustainability. 11. Refurbished medical devices are offered, relieving financial pressure on healthcare organizations.	4. When a corporation tries to be a market leader in too many product categories, it dilutes its focus and the quality of some of its offerings inevitably suffers. 5. Health care anxiety has been fueled by the public's ignorance about numerous life-saving medical advances.
Opportunities	**Threats**
1. Creating resources for healthcare providers that prioritize patient education and prevention. 2. Government mandates and guidelines for the growth of electronic health records. 3. Globalization and the rise of the industrialized nation. 4. Profitable Prospects in Overseas Markets. 5. Developments in Artificial Intelligence. 6. Business Models Focused on Online Commerce and social media.	1. Due to the ever-increasing price of healthcare, businesses are becoming increasingly unwilling to invest in expensive machinery. 2. The government recognizes that medical goods and devices have the potential to significantly increase healthcare expenditures, thus it limits their pricing. 3. Because of the success of healthcare reform, healthy people of the future will have less need for healthcare items. 4. Strong inventive rivalry from the marketplace (like GE healthcare and Siemens). 5. Threats from New Market Participants as a Result of Falling Prices and Rising Productivity.

14. INITIATIVES TAKEN TO FIGHT AGAINST COVID-19 :

The widespread destruction wrought by the COVID-19 outbreak has triggered a worldwide hunt for innovative solutions. In light of this unprecedented medical catastrophe, the world's eyes have turned to the digital health sector for potential health answers [65]. Communities around the world have had to make major adjustments to their way of life in response to the recent global spread of Coronavirus Disease (COVID-19), an outcome of the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) [68].

Philips Healthcare is available to support hospitals and patients as the COVID-19 pandemic spreads. The Healthcare Transformation Services team, which is made up of experts with years of combined experience in clinical and leadership roles, is skilled in a variety of areas, including patient flow, clinical process optimization, technology consulting and system integration, and overall care delivery. The team's top priority is assisting hospitals and patients as they navigate the current healthcare crisis. Here are some of Philips' most important decisions and actions done during the COVID - 19 pandemic [69].

1. Clinical assurance and strategic support - The team provides support by assessing safety plans, disseminating best practices, and offering suggestions for enhancements. They offer impartial advice on how to implement effective clinical governance during an emergency.
2. Site reconfiguration guidance - The clinical and design experts can help with the planning of new or temporary hospital locations as well as the reorganization of current facilities to boost intensive care unit and diagnostic capacity. The service offering also includes clinical workflow, staffing models, equipment/supplies validation, capacity planning and patient flow design.
3. Critical Care process optimization - The experts may evaluate clinical workflow, technology, and practices in critical care to apply good practices and maximize the use of eICU, telemetry, and clinical operations centers.
4. Patient throughput and flow optimization - Safe, sustainable, and efficient operations can be supported by the consultants' assistance in implementing good practices in capacity optimization, patient flow and operations. They use methods like patient flow simulation and operational excellence to better care for patients and increase efficiency.
5. ED process optimization - The company has emergency department (ED) specialists around the world who help with things like improving triage procedures, decreasing wait times, and managing crowding. Their expertise is in emergency room management during high patient volumes.
6. Data analytics - Patient volume, patient flow, scheduling, room utilization and physician metrics can all be better understood with the use of data-driven insights provided by custom analytic performance dashboards. COVID-19 specific data such as patient presentations, diagnoses, geographic distributions of patients, and patterns are included.
7. Diagnostics optimization - The company's focus is on delivering process optimization projects in the fields of Radiology and Pathology. These sections are particularly important at the moment since they assist pinpoint bottlenecks in the system and devise strategies to eliminate them, so increasing capacity and throughput.
8. Informatics, Business intelligence and IT - The company provides consultation services in the areas of healthcare IT, including data collecting, data security, and network connectivity [69].

15. RECOMMENDATIONS AND SUGGESTIONS :

Based on the above evaluations, we provide the following recommendations:

(1) There is a huge selection of medical supplies available from Philips. The R&D department can be better utilized if the corporation focuses on a smaller number of more complex pieces of equipment.
(2) Falling product sales can be attributed in large part to the rising price of medical equipment and the government's pricing policies for medical goods and devices. Company price has to be revised. The company has to build a better pricing strategy.
(3) When compared to competitors, the company's distribution network must be strong and easily accessible.
(4) People nowadays are more concerned about their health than in the past. In order to serve the public, the company must create more cutting-edge medical innovations.

16. ROLE OF ARTIFICIAL INTELLIGENCE (AI) IN HEALTHCARE INDUSTRY :

Machines that can learn and reason like humans are said to be using artificial intelligence (AI), which is being called the fourth industrial revolution [62]. While machine learning has numerous potential applications in healthcare, its reliance on training data is a significant barrier to wider use [63].

The ageing population and the prevalence of chronic diseases are putting a strain on healthcare systems around the world, which are already struggling to meet rising demand for these services despite limited resources. It is widely acknowledged that a significant part of the solution to this problem lies in digital transformation based on the incorporation of technologies like the Internet of Things (IoT) and Artificial Intelligence (AI) [50]. The exponential growth of digital data and the improvements in computer technology are largely responsible for AI's continued advancements [46]. A recent development in the field of artificial intelligence (AI) has great promise for advancing healthcare and medical research [47]. The Internet of Medical Things (IoMT) is a cutting-edge bio-analytical tool that integrates software with networked biomedical devices to improve human health [57]. Artificial intelligence has the potential to improve healthcare delivery while also lowering costs and increasing opportunities for information sharing across professionals [58].

Several innovators have contributed to the healthcare industry by creating and releasing AI algorithms and technologies. Artificial intelligence (AI) is increasingly being used in the field of medicine, and one area where it is showing promise is in the field of cardiovascular disease management, where it is being used in predictive and preventative medicine to improve the efficiency and effectiveness of diagnosis and treatment [48]. Effective therapy of coronary artery disease relies on cardiac imaging to risk-stratify patients who may require future treatment [49]. The processing of medical images first made use of machine learning-related technologies, such as supervised learning technology, in the 1990s. Training involves the input of medical images, the extraction of important features, and the subsequent performance of operations such as classification [52]. A person's health, behavior, physical posture, and environmental factors can all be monitored with the help of Internet of Things (IoT) and fog technology [53].

Artificial neural networks (ANN), a subfield of machine learning, have quickly gained traction as one of the field's most prominent approaches. In order to accomplish their goals, ANNs take in data through a sequence of inputs, weigh the significance of those data points, and then make a decision [61].

Clinical applications for Machine Learning algorithms in the diagnosis of cardiovascular disorders are possible. Helping the doctor prescribe the right medication and avoiding wasting time and money on ineffective therapies is a win-win. People in remote areas will have better access to quick, cost-effective diagnostics with the help of this method [55]. When applied to coronary angiography videos, machine learning has the potential to rapidly and correctly measure arterial narrowing and blockages [56].

Improved early detection and prompt treatment of cardiac diseases can be achieved by the short-term automated machine learning process that can partially replace and promote the long-term specialized training of primary practitioners [59]. Machine learning could be used in routine health checks for young people to detect and prevent heart failure before it becomes a serious problem [60].

The development of wearable technologies has opened up new avenues for the detection and management of cardiovascular illnesses and related risk factors. Heart rate and rhythm monitors and blood pressure monitors, for example, are now widely used outside of hospitals and can be purchased by individuals [64].

17. CONCLUSION :

The Philips group is an industry powerhouse that operates in countries all over the world. The company's research and development department are strong and uses cutting-edge tools. The business has extremely effective policies on environmental friendliness and social duty. While the company was an early innovator in the consumer electronics market, it has struggled to break into the healthcare market. By addressing these factors, the company can eliminate the obstacles and reach the pinnacle of success in the healthcare industry.

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