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CONTRIBUTION OF INFORMATION TECHNOLOGY TO THE MEDICAL SECTOR

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ABSTRACT

Constant, widespread, and far-reaching shifts occur in every industry. There is no denying the evidence from the scientific community that advances in technology have helped extend and improve human lifespans. Inevitably, the current digital transformation will have far-reaching effects on the healthcare sector. In the long run, the purpose of digital health is to reduce unnecessary doctor visits by encouraging individuals to adopt healthier habits and stay physically active for longer. More information on fitness indicators like activity and blood pressure is what makes this possible. Improved patient care is a future outcome of virtual reality (VR) technology, wearable medical devices, telemedicine, and mobile technologies. Doctors' productivity, however, can be boosted by healthcare systems that are AI-enabled. It is becoming widely acknowledged that the advancements made possible by digital health are vital to the modern health care system. However, a country's ability to make use of these opportunities and guarantee their fair distribution is constrained by social and economic factors. Even though many of these shifts are just now being felt due to pushback from organisations and individuals averse to change, they are inevitable as a result of the phenomenal growth of digital technology around the world. Policymakers need to establish the tools and skills to perceive, check, direct, and oversee the integration of both promising and demonstrated digital health technologies into primary care and public health settings. Careful consideration of the country's context is vital even when implementing revolutionary processes to guarantee adequate oversight and regulation are in place to fully appreciate the benefits and prevent any potential downsides.

INTRODUCTION

The most recent estimate from IQVIA claims that there are more than 318,000 health apps accessible. According to the organization's own statistics, 200 fresh health apps hit the app store shelves every single day. These data show that the aid industry as a whole is about to undergo a digital change. The rising usage of digital health apps has had a substantial impact on five major diseases that have a huge impact on the health of a society. Acute diseases like type 2 diabetes, asthma, internal organ disorders, and respiratory conditions are particularly amenable to the therapy, prevention, and control offered by these fitness apps. Incorporating cutting-edge technologies like massive data analytics, the internet of things (IoT) based on entirely connected fitness devices, geo-location technologies, block chain, and many other applications into mobile fitness apps is expected to have a significant impact on the digital health app market, according to the report.

The plethora of new and revolutionary technologies being introduced and how they are revolutionising support systems and the success of fitness applications are shown by these facts and insights. Customers will be able to practise modal medicine with just their smartphone and an app, which should bolster their condition-specific professional care in tangential ways. Patients with hypertension, for instance, can benefit from using a ready-to-wear joined blood pressure cuff, which can indicate whether or not the user's blood stress is high and thus assist in discovering not solely what lifestyle changes square measure booming but also that medications will facilitate management of the circumstance (or even if anybody has "white coat syndrome," where the stress of being in an exceedingly doctor's office causes a rise in blood pressure). Diabetics can improve their treatment programmes and dietary habits by keeping track of their glucose levels over time. The use of many aldohexose VDUs at once allows for this to happen. As digital health tools improve, more and better information on these metrics will be collected and made available to doctors so that they may evaluate the results and fine-tune how they are administered.

Despite the comforting idea that these systems were developed for the altruistic purpose of keeping healthy people healthy for longer, the ultimate goal of using digital health to manage chronic conditions is to reduce vendors' fees by reducing the number of doctor's visits, hospital room visits, and even hospital admissions that mortals with such illnesses need. The efforts of companies on both sides of the digital health spectrum point to a future in which "consumer" and "medical-grade" digital health goods intersect in the digital fitness sector. One example is the incorporation of an electrocardiogram (ECG)-like capability into the current Apple Watch. The ability for a consumer device to detect illnesses like atrial fibrillation that have gone undetected in the past is a game-changer for both patients and their doctors. In a similar vein, "increasingly" (more and more) digital capability is being added to medical and scientific gadgets. For instance, Medtronic, a developer of medical devices, has created an app that lets people with internet-enabled pacemakers share data with their doctors via their smartphones.

Impact of Technology on Health Care: Digital health, or the application of technology in service of improving health and well-being, is a relatively new but deceptively straightforward field. We will cover the full gamut of topics, from ingesting sensors to mobile health apps, from computer science to robotics in the workplace, and from paper records to digital ones. It's all about adapting the digital transition, with its intricate technologies and necessary cultural transformations, to the aid industry. Disease prevention, patient monitoring and management, cost reduction, and the development of individualised treatments are just a few of the many complicated goals of the healthcare industry. What makes the aid industry so interesting is that its goals may benefit not just patients but also the firms that provide assistance to them. By gathering more data on health indicators like activity level and force per unit area, digital health is expected to help people improve their lifestyles and maintain their physiological condition for longer, resulting in fewer trips to the doctor. Similarly, digital health tools may aid in the early diagnosis of diseases or the tracking of a preexisting condition's course. Clinical intervention at an earlier stage in the course of a sickness, made possible by digital health tools, has the potential to shorten the length of an illness or ameliorate its symptoms before they become severe. Not only can digital health improve people's quality of life, but it also has the potential to lower their lifelong medical expenses.

Digital Health Market: Despite the fact that scholars have varying viewpoints on which technologies fall under the digital health umbrella, most believe that the business is worth tens of billions of dollars at the very least. The market is expected to grow to $223.7 billion by analysis and markets in 2023, $379 billion by global market insights in 2024, and $536.6 billion by transparency marketing research in 2025. Digital prescriptions, electronic patient health data, and telemedicine are just a few examples of how aid organisations use technology. Digital health reports for clients are much less common than industry-wide reports, and they often cover very specific topics. Since more and more people are interested in keeping tabs on their health, the wearables market is expected to grow to $27 billion by 2022, according to research firm CCS Insight. Meanwhile, the mobile health industry is expected to grow to $189 billion by 2025, according to research firm Analysis and Markets.

Anxiety About Technology and Medicine: Everyone, regardless of age, gender, race or ethnicity, financial status, medical history, or ability to pay, should have access to and use digital health to reach its full potential. People who use digital health tools, particularly wearable ones, are more likely to be in better health, have more financial resources, and be younger (twenties to forties) than the general population (though makers are increasingly targeting older shoppers; therefore, that is probably going to vary with time). To date, digital health services have only collected data that is relevant to a niche group of people. It's commonly accepted that "the upset well," or healthy individuals who aren't suffering from any chronic conditions, are the most likely to be interested in digital health. As digital health products become more and more mediatized, there is a greater risk of false positives and false negatives, with some people

being "diagnosed" with a disease and forced to undergo unnecessary doctor's visits and office tests, while others are told they are fine by their smart watch or fitness band and fail to head to their doctor when they extremely ought to. It is uncertain what role, if any, insurance companies will have in the adoption of digital health technologies. Companies increasingly provide low-cost or free wearable devices to customers who achieve fitness targets. It's hardly a stretch to think that in the future, data from these devices may affect ratings and credentials, which could encourage customers to reveal more information than they're comfortable with. Keep in mind that not everyone shares our optimism for the future of wearables and other forms of technology. The aid industry is just one sector that has been slow to update and ditch the fax machine.

Smartphones' Crucial Function: The most glaring trend should be addressed first. The use of mobile apps is now the most practical way to guarantee substantial involvement from patients. Within an hour of an emergency, it is now easier than ever, with the help of mobile health apps, to get in touch with doctors and hospitals. Mobile app development has permeated aid systems worldwide, and as a result, these apps have made important contributions to the prevention, treatment, and management of many crucial diseases. For instance, smartphone apps have recently gained prominence as a tool for the management of type 2 diabetes. The exponential growth and popularity of mobile health apps undoubtedly alter the nature of modern medicine. These days, healthcare facilities all around the world rely heavily on mobile health apps to run their day-to-day operations. The promise of mobile apps in the healthcare system is not limited to better treatment; these apps have also greatly contributed to making healthcare more inexpensive and accessible. The vast majority of smartphone users also use a health-related app. The health app market has experienced phenomenal growth, with an accompanying increase in diversity. It is impossible to imagine a modern aid system without the assistance of mobile health apps. The mHealth app market is sizable and expanding, which is fantastic news for the industry as a whole. Because of the revolutionary impact of health apps, hospitals that don't offer mobile health applications risk losing business to competitors that do.

Confidence in Health-Related Matters: Patients no longer need authority figures in the form of caregivers or practitioners for basic health care decisions. The Internet and other digital resources have made it easier than ever for people to access quick, reliable information about the symptoms and causes of a wide range of ailments. Patients nowadays have a far better comprehension of the numerous diagnostic criteria and therapy strategies utilised in contrast to patients in the past. Connecting a basic, user-friendly medical gadget to a smartphone app allows you to examine and analyse data from common diagnostic procedures, such as monitoring glucose levels, force per unit area, and heart rate. The proliferation of patient-generated medical data has been greatly aided by these self-diagnosis medical technologies. Patient-generated medical data has the potential to teach clinicians and medical students a great deal, and it can also be used for the critically necessary and convenient task of remote patient surveillance. The mobile health app sector is continually creating new patient observation apps for mobile devices, including smartphones, smartwatches, and other wearables. Constant monitoring is required in the case of a moderately significant emergency with certain acute illnesses such as diabetes, cancer, depression, and systole. Patient-generated diagnostic information and helpful in-home medical gadgets allow for remote assessment of the patient's status and the transmission of continuous usage recommendations.

Intelligent Medical Electronics: The concept of the Internet of Things has evolved beyond the network of networked devices that improve the functionality and comfort of our homes. Manufacturing and the nonprofit sector are just two areas where the Internet of Things has had an impact. The use of assistive IoT devices and applications has the potential to completely revolutionise the delivery of healthcare. The first connected assist devices were wearable health and fitness trackers, which transmitted health data and insights in real

time via connected mobile apps. In spite of this, the IoT has proceeded to change numerous disconnected pieces of health equipment into linked gadgets that may communicate persistent patient data to medical specialists. The Internet of Things is leading the charge to connect all healthcare devices and equipment, paving the way for a plethora of medical health apps. Many exciting new advancements in healthcare are on the horizon, all made possible by Internet-connected medical devices. Helpful Internet of Things devices, from diagnosis to therapy suggestions in real time, will revolutionise hospitals and clinics. With the use of retagging and site-following technology, these Internet of Things devices can improve inventory management for service providers.

Blockchain Technology in Healthcare : Protecting patients' personal information from hackers and other security breaches is a top priority for hospitals around the world. This is especially important to keep in mind while contemplating the myriad security threats associated with Internet-connected medical equipment. Health Insurance Portability and Accountability Act of 1996 (HIPAA) rules must also be followed by connected aid devices and applications to provide the greatest level of data security. Block chain, the most secure kind of distributed information technology, will simplify the process by which aid systems address any problem. When it comes to safeguarding private data, there is no technology more cutting-edge or well-equipped than the block chain. With blockchain technology, all parties involved in an organisation can freely access and exchange any data without danger of unauthorised disclosure, as the ledger is immutable once recorded. Patient information is safest when medical institutions use blockchain to empower their expertise. Block chain will enable health apps to give a substantially greater user experience by doing away with so-called "safeguarding" security methods like registration and passcodes. The use of blockchain-based mobile apps, however, will save significant time in the case of numerous aid facilities. Individualized patient records and databases can be accessed without restriction using block chain technology, which also prevents tampering with the data.

Data Analytics and its significance: Big data analytics for digital health applications have emerged as a means of producing novel approaches to healthcare in concert with the most significant emerging technology. Digital aid and an increasing number of mobile health apps push for an uncontrollable expansion in medical knowledge, and this presents a significant challenge for many service providers. The potential for gleaning the most crucial insights from medical information inspired researchers to examine the relationship between aid facility research and big data analytics. In the near future, data scientists will be able to sift through reams of data from the healthcare industry, including patient records, treatment histories, demographic information, information about medical equipment and supplies, information gleaned from health app users, information about requests for assistance and insurance coverage, details about the services provided, and much more. We are soon approaching the stage where organisations have the most relevant data to begin modelling the risk variables linked to a particular patient or operation. For instance, we can make educated guesses about a patient's recovery duration or readmission probability. The potential for big data to revolutionise healthcare remains unrealized. Knowledge-driven insights gained from analysing the many parts of medical and health care data are seen as the true potential of big data analytics. Thanks to the robust resources made available by big data analytics, medical professionals will be able to make better decisions for their patients' health. On the other hand, if doctors analyse the symptoms of thousands of patients who are similar to one another, they will learn more about the condition and the best method to treat it.

Payments Made Via Mobile Device: Mobile payment has emerged alongside other paradigm-shifting phenomena within all types and subgroups of mobile apps in recent years. The ability to accept payments on the go via a mobile device is a huge boon for health-related apps. Several health apps now allow patients and support subscribers to pay for services directly from their mobile devices within the app. The trend among health app makers is toward building

in mobile payment options. Customers may now get the quickest possible medical care and save time and effort by paying for it all at the convenience of their smartphones. When aid organisations operate around the clock to cope with emergencies and other critical concerns, the added stress of late payments can be mitigated by the convenience of mobile payments. When you need to pay for drugs out of pocket, make an appointment when you're away from home, or check on a loved one's vitals while they're hospitalised, mobile payments can help you avoid problems and deliver the medical treatment you need to you or them quickly and easily.

Web-Based Healthcare: Any comprehensive review of the mobile health app market across all platforms will undoubtedly conclude that telemedicine service applications are the best of the best when it comes to medical health apps. The value of the telemedicine market is projected to reach $40 billion by 2021. By themselves, telemedicine apps have completely altered the ways in which doctors and patients communicate and collaborate. Thanks to the development of telemedicine apps, there is no longer any reason for a patient to wait for treatment since their doctor is located far away. With the help of these apps, detecting and treating chronic diseases and a wide range of common health complaints is easier than ever before, according to the vast majority of medical specialists. Telemedicine apps on mobile devices allow chronic patients to stay in touch with their doctors and receive timely advice and drug prescriptions. More than half of telemedicine users report that it is more convenient to use these tools than to visit a clinic in person for routine care and treatment. It's hardly shocking that telemedicine apps have become the standard for providing healthcare to people in far-flung locations.

Errors in digital technology

Artificial Intelligence & information Analytics: When making decisions in the care industry, officers frequently must weigh the pros and cons of balancing service quality, cost, and convenience. In a perfect world, all people would need to do to get good medical treatment is visit a clinic and get a prescription. However, in the real world, things rarely turn out that way. Fortunately, AI has the potential to make business more accessible, affordable, and productive. The increasing efficiency of AI systems will not only reduce expenses but also free up human workers to focus on more intricate, patient-focused tasks. In the future, when self-service terminals are made available, artificial intelligence (AI) could be utilised to persuade people to use them, freeing up clinic and hospital resources that could be focused toward bettering patients' health. Twenty percent of unmet healthcare needs might be covered by AI solutions, according to research by Accenture. By 2026, Accenture believes the attention economy may help save up to $150 billion annually through the use of advanced AI systems. Furthermore, AI technologies are being developed to assist healthcare personnel in speedily analysing vast data sets. For instance, artificial intelligence software systems may do CAT scan analyses in a matter of seconds, substantially reducing the amount of time a patient must wait for results. The patient experience is greatly enhanced by applications such as this one, which expedite the delivery of care. The benefits of AI are starting to be realised by business leaders. According to the PWC Health Research Institute, 40% of healthcare executives spend money on predictive analytics, AI, and machine learning. Due to its potential to enhance attention services, artificial intelligence is receiving massive financial investments. Investment estimates put the sum of governmental and private funds into AI at $6.6 billion by 2021. Individualized treatment is especially helpful when it comes to medication, and AI has the capacity to provide this. Artificial intelligence software, for instance, can search through reams of medical literature to identify a treatment strategy that makes sense in light of a patient's diagnosis, age, and other parameters.

Augmented Reality: Technology like video games and augmented reality is revolutionising the entertainment sector. Forecasts place the healthcare augmented reality and virtual reality industry at $3.2 billion by 2023, up from $933 million in 2018. Both patients and doctors can benefit from the use of AR and VR in the medical field.

By using VR, doctors may practise procedures that could hurt patients without really putting them in danger. Surgeons are increasingly turning to augmented reality to help them through complicated procedures. Using augmented and virtual reality technology can improve the therapeutic experience for patients as well. Reliving happy memories from the past with augmented and virtual reality is helping dementia and senile dementia patients who are hospitalised. Also, VR is being used as a medical aid tool to help people get over unpleasant and traumatic experiences that are otherwise hard to talk about. Virtual reality (VR) has been shown to alleviate pain for burn patients by 35–50%, according to studies.

Telemedicine: Several cutting-edge methods are revolutionising the connection between patients and healthcare providers. Consumers can find and visit a doctor with less hassle thanks to modern innovations in the field. One way that telehealth technology is broadening people's access to medical treatment is through the use of virtual appointments. People in remote or rural areas can now see doctors via video chat, where this was previously impossible. Patients who are unhappy with the care they are receiving can use this technology to check on their medical staff. As word of the advantages spreads, a growing number of people are making the transition. From one million in 2015, seven million are expected to use this technology this year. By 2021, the worldwide market for telemedicine is expected to reach $66 billion. In a recent big financing round, European telemedicine giant Doctolib raised €150 million. Patients can use Doctolib's online services to identify general practitioners and specialists and book appointments with them with ease. Doctolib is eager to improve their platform to better facilitate online consultations between medical experts and patients in light of the potential of telemedicine and the outcomes of their most recent investment round. Patients are better able to communicate with their doctors and receive the care they need thanks to the proliferation of mobile applications and websites. Improvements in patient management and consumer satisfaction are the end results of these changes.

Data Processing: One of the biggest challenges facing the attention economy is the time and energy required to process and analyse data. Large quantities of data collected by hospitals and doctors also have a role. Companies struggle to improve patient care and personalise therapy without powerful AI tools to analyse this data. The collection and organisation of data is another crucial step. Since fewer patients are seeing their doctors in person thanks to telemedicine, it's become trickier for them to maintain accurate patient records. Therefore, it will be essential for the healthcare business to find the best way to ensure that both paper and electronic patient records are always accurate. Companies are now subject to stricter regulations on the collection, use, and storage of sensitive customer information as a result of new laws such as the EU's General Data Protection Regulation (GDPR). Under GDPR, a company can be fined up to the greater of €20 million or 4 percent of its annual global revenue. As a result, it is crucial that all companies meet the standards set by the General Data Protection Regulation (GDPR).

Cyber security: Cybersecurity threats might affect any industry, including the attention economy. Businesses would be wise to remain vigilant against cyber dangers, lest they incur heavy losses. One study by IBM found that the cost of a data breach in the entertainment industry was three times higher than in other industries. Weak user authentication, inappropriate user termination, and excessive user permissions are the three most common security issues in attention systems. Taking the required measures to strengthen these areas is essential to safeguarding the attention sector. Even more attacks may be possible because of the company's newfound reliance on the Internet of Things and other forms of medical support. Due to security flaws in IoT devices, manufacturers will eventually stop releasing patches. Threats can originate from both intentional actors and design or code flaws in the product. In 2018, a cryptographic oversight in the code led to the unauthorised release of information on 150,00 British patients. Before publishing new versions or updates, developers of software, mobile apps, websites, Internet-of-Things

devices, etc. should do security audits to ensure that their products are free of this type of vulnerability.

Digital User expertise: The creation of a fully working, user-friendly digital product, such as a smart TV, a smartphone app, or a web service, can be challenging. When designing cutting-edge tech products and services, consumers' wants and requirements must always come first. Given the widespread usage of healthcare items by both patients and medical professionals, this is crucial. If an IoMT device causes patients pain or inconvenience, they may remove it before it has a chance to collect enough data to be beneficial. If the IoMT device's software is difficult to use, however, medical professionals are less likely to recommend or require it for their patients. Without proper standards in place, especially for IoMT, these product-related services have a harder time operating optimally within a network of connected devices. Nonetheless, the general quality of the technology may be the most important factor in acquiring major advances for the company.

Quality assurance testing in care: Quality assurance (QA) testing is essential to the creation of any digital product or service used in healthcare. The purpose of quality assurance testing is to evaluate a program's performance under realistic conditions. For example, if a company releases a website or linked medical gadget that is riddled with bugs, it could have disastrous consequences for itself, its customers (doctors, hospitals, and patients), and anyone else who uses the product. Regardless of the root cause, software defects reduce efficiency and erode customer faith in a company's offerings. Without quality assurance testing, no company or product could possibly succeed in the healthcare sector.

CONCLUSION

When seen in the context of their tremendous potential and promise, the aforementioned tendencies for digital healthcare and scientific apps are simply the tip of the iceberg in terms of their ability to revolutionise healthcare delivery. These breakthroughs will boost patient care and be widely implemented. The FDA appears to be assisting digital fitness companies in passing the certification process more swiftly, which can be a stumbling block for new technologies. In 2017, as part of its Digital Health Action Plan, the FDA published new regulations for digital fitness, including the introduction of a pre-certification application for select developers and clarification of which devices are under its control. Early this year, a new programme was introduced with the goal of recognising businesses "that display a tradition of satisfactory and organisational excellence based on objective criteria." Verily has joined Apple and Samsung as partners. Additional regulations may be introduced in Europe. When it enters into effect in 2020, the Medical Devices Regulation (MDR) will modernise the rules governing digital health products. improved medical device monitoring alongside more precise definitions of "clinical devices," "software," and "apps."

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