

Economics of Sustainability of Psychological Health care and Scope for Artificial Intelligence

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Abstract

The idea of sustainability is to satisfy current needs without endangering the capacity of future generations to satisfy their own. It all comes down to striking a balance between social progress, environmental preservation, and economic expansion. A common way to symbolize sustainability is with three interrelated pillars, namely environmental, economic and sustainability in terms of society. The main goals of economic sustainability are balancing ethics and profits, creating an economy that is circular, and Creating stability of jobs. (Ghisellini, 2016) The healthcare industry, is a unique fusion of manufacturing, services, and high-stakes human interactions. (Alaric, 2023) It is distinct from other industries because of its sophistication, regulations, and the significance of the services it offers. The growing use of digital communication might lead to fewer in-person communications, which can at times deepen feelings of seclusion and isolation and there is an increase in the frequency of mental health issues in recent times. In this paper an effort is made to understand the economics of mental health care and an exploration is made about the increasing linkage between growing use of artificial intelligence and economics of mental health care.

Keywords: Mental health care, depression, economic sustainability, artificial intelligence, return on investment.

Introduction

The idea of sustainability is to satisfy current needs without endangering the capacity of future generations to satisfy their own. It all comes down to striking a balance between social progress, environmental preservation, and economic

expansion. A common way to symbolize sustainability is with three interrelated pillars. Environmental Sustainability Preserving natural resources, cutting down on pollution, and safeguarding ecosystems are the main objectives. Conservations, trash reduction, and renewable energy are examples. Secondly, Economic Sustainability guarantees steady, long-term growth while taking social and environmental effects into account. Fairtrade, green jobs and sustainable enterprises are a few examples. The third one is the Social Sustainability Which Encourages fairness, justice, and the health of the community. The Examples include community development, affordable housing, healthcare, and education. Our present concern is economic sustainability. The main goals of economic sustainability are balancing ethics and profits, creating an economy that is circular, and Creating stability of jobs. (Ghisellini,2016)



While dealing with the economics of any issue, researchers often encounter the paradox of the coexistence of economy and sustainability. Every researcher needs to understand the importance of being sustainable here. While we preserve natural resources, it guarantees that impending generations will have access to resources such as air, water, and forests. Mitigating climate change ensures the lowering of greenhouse gas emissions in the fight against global warming. It also ensures social equity by establishing a reasonable and fair

society for everybody. So by economic growth, we mean encouraging industries and enterprises that are sustainable so that better quality of life can be lived by improving general health by building robust communities and wholesome surroundings.

However, achieving sustainability is a difficult task that calls for cooperation from organizations, companies, and private citizens. It also offers a lot of potential for innovation, employment growth, and improved futures.

II. Uniqueness of Health Care Service in contrast to other Manufacturing and Service Industries

The healthcare sector differs greatly from other service sectors and industries for several important reasons. Taking into account the type of good or service, manufacturing creates quantitative output of tangible goods whereas the service sector offers intangible offerings with a customer satisfaction-focused approach. Yet healthcare provides a sophisticated fusion of these two. The use of medical knowledge and experience to treat patients is the primary service, albeit it also incorporates physical products like medications and medical equipment. (WHO,2010) Products in manufacturing have predictable results and consistent quality standards, which reduces outcome variability. In the service industry, the way a service is delivered and how customers interact can affect the results. Yet, patient conditions, technological improvements, and human error all have a significant impact on the very variable outcomes in healthcare. While we take into account the liability and regulation features of these very different industries, manufacturing is subject to rules but has comparatively fewer liability concerns. The service industry is subject to regulatory scrutiny, yet service delivery is frequently the extent of culpability. Healthcare is heavily regulated, with strict requirements for both safety and quality. There are major dangers to one's finances and reputation associated with medical errors and malpractice.

Automation and technology are major factors in manufacturing when it comes to the human element. In the service industry, human interaction is important, but it's also

frequently formulaic. The human factor is immensely critical in the healthcare industry. (Leonard,2004) Caring for patients demands compassion, empathy, and individualized attention. Once more, regarding Cost and Payment, in manufacturing production inputs are what mostly determine costs. The market's demand and competition determine pricing. Labor and overhead have an impact on costs in the service industry. Negotiated or service package-based pricing is very common. Healthcare displays related to a combination of direct and indirect costs, costs are complicated. (Kaplan,2011) There are many different types of payment models, such as managed care, fee-for-service, and government initiatives. Cost containment and product enhancement are the main goals of manufacturing innovation and research. Innovation in the service industry is mostly focused on customer experience and service delivery. However, the focus of healthcare is on advancing technology, medication development, and medical research to enhance patient outcomes. The safety of products and the environment are the main concerns of ethical considerations in manufacturing. Fair business procedures and client privacy are the main concerns in the service industry. However, healthcare deals with difficult moral conundrums such as patient confidentiality, resource allocation, and end-of-life care.

The healthcare industry, then, is a unique fusion of manufacturing, services, and high-stakes human interactions. (Alaric,2023) It is distinct from other industries because of its sophistication, regulations, and the significance of the services it offers.

I. The Growing Significance of Mental Healthcare

Without a doubt, in recent years, mental health treatment has grown in acceptance. There are several reasons for this increased prominence.

First, there is an increase in the frequency of mental health issues. Social media, fast-paced work environments, and financial complications are characteristics of modern lives that raise stress and angst levels. (Powers,2019) The growing use of digital communication might lead to fewer in-person

communications, which can at times deepen feelings of seclusion and isolation. Another aspect is a decrease in the stigma associated with mental health care. Because mental health issues are becoming more widely understood and apparent, more people are seeking help.

There's also the financial and economic aspect. A person's ability to work is greatly wedged by mental health concerns, which can have a financial cost to both the individuals and the organizations. Once again, treating mental health conditions can be expensive, which strains medical facilities.

Thirdly, the idea of physical health is an important concern. Mental health illnesses are often linked to physical health concerns and lingering conditions such as heart disease, diabetes, and chronic pain. Individuals who experience anxiety or depression may have a compromised immune system, making them more susceptible to illness.

Fourthly, technological improvements are vital in this context. Technology has made mental health treatments more accessible and has made it easier for people to ask for help. Resources that are appropriate to managing mental health and self-care resources are accessible via online resources and apps.

Furthermore, in this case, societal views have amended. The de-stigmatization of mental health care therapy is a significant trend that is seen in modern times. The stigma associated with receiving therapy is decreasing as more people acknowledge mental health as a genuine medical condition. More and more people are realizing the value of holistic well-being, which covers both physical and mental health.

Ultimately, the significance of mental health care is irrefutable. Treating mental health issues can improve individual well-being, foster stronger, more buoyant societies, and increase productivity.

II. A.I.- The Real Game Changer

Artificial intelligence (AI) is causing a rapid alteration in the healthcare industry by offering hitherto unheard-of opportunities for increased efficiency, innovation, and

improved patient care. To begin with, it ensures better diagnosis and treatment. To assist in the early diagnosis of diseases, AI-powered algorithms can reliably and effectively evaluate medical images, (Pinto-Coelho, 2023) including MRIs, CT scans, and X-rays. AI speeds up the search for innovative treatments by identifying potential drug candidates and forecasting molecular interactions. AI can assess patient data and generate customized treatment plans. AI-enabled virtual assistants can roster appointments, provide medical information, and monitor patients' health for better patient care. Devices with AI capabilities can track health indicators such as vital signs and enable suitable emergency action.

Artificial Intelligence-powered chatbots can offer emotional support and cognitive behavioral treatment. They can also automate a variety of administrative tasks with ease and speed, including claims processing, appointment scheduling, and medical record management. Artificial intelligence can optimize the supply chain by reducing costs and enhancing inventory control. It can also predict the number of patients, the distribution of resources, and potential epidemics.

Nevertheless, there are other examples where difficulties must be taken into account. Privacy of information is one of them. Safe guarding sensitive patient data is of the utmost importance. Ensuring the neutrality of AI algorithms is also essential for preventing disparities in healthcare. Most significantly, artificial intelligence should be used in collaboration with human understanding, not replacing it.

III. History of A.I. in Mental Health Care

AI was first used in psychiatric healthcare in the mid of 20th century, which also marked the beginning of the computing era. At that point, scientists began to envisage the possibility of robots imitating mental functions, which unbolted the door for later improvements in this field. Developing AI models for human problem-solving was the aim of the ground-breaking research carried out by AI pioneers Allen Newell and Herbert A. Simon in the 1950s and 1960s. The fundamental ideas of figurative AI were established by their work, which subsequently proved useful in the recreation of

cognitive processes in mental health settings. This early AI study, though primitive by today's standards, set the stage for a large convergence of AI and psychology.

Joseph Weizenbaum developed one of the first AI applications in psychology by the late 1960s and early 1970s.(Bassett,2019) ELIZA, his program, was a chatbot designed to copy a Rogerian psychotherapist. Even though ELIZA's responses were somewhat straightforward, they might encourage text-based deliberations amongst users and offer insight into how technology might enable communications related to mental health. Over the years, there has been an enlightened growth in the application of AI in mental health treatment. The 1980s saw the start of the formation of expert systems, rule-based artificial intelligence systems intended to imitate human expertise. These systems aimed to offer references for diagnosis and treatment in numeral psychological areas. Even though these early AI systems' competencies were fairly limited in contrast to those of modern AI, they however marked a significant breakthrough in the synthesis of technology and mental health.

Cognitive-behavioral therapy (CBT) programs that are digitalized began to appear in the late 20th century. The goal of these collaborative software programs is to present treatment approaches based on the exploration of common psychological health issues. AI's influence on mental healthcare has grown suggestively as computing power has increased. The 21st century has seen the progress of AI in several areas related to psychological healthcare, such as early recognition of mental health issues, tailored management programs, simulated counselors, improvements in tele-treatment, and ongoing specialist care. These modern AI systems have the prospective to entirely transform the mental health care industry by improving information-guided, efficacious, and handy services.

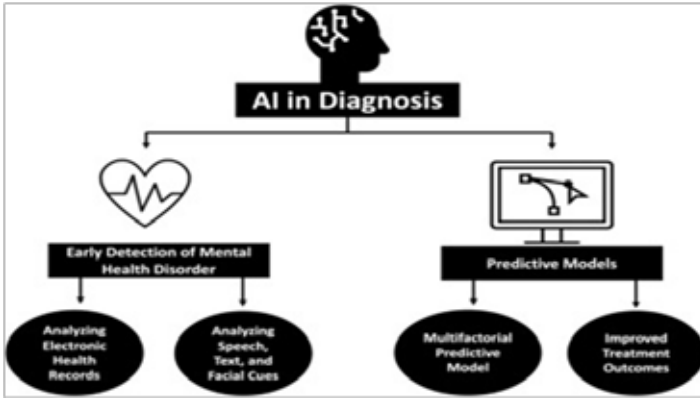
From early perceptive modeling to the refined AI-driven interventions of today, the history of AI in mental healthcare is characterized by some evolved turning points. This journey submits a future where AI plays a critical part in handling global mental health issues, replicating the ever-growing

understanding of expertise's capacity to help and endorse mental well-being. Some specific AI tools utilized in modern mental healthcare are highlighted in the table below.

Table-1

AI Tools	Virtual Robot Based Treatment
Woebot	A chatbot called Woebot offers CBT-based therapy for anxiety and despair. Clinical research has demonstrated its efficacy in mitigating symptoms of anxiety and sadness.
Wysa	A chatbot named Wysa offers therapy support for a range of mental health issues, such as loneliness, stress, anxiety, and depression. It helps people enhance their mental health by combining CBT, mindfulness, and positive psychology.
AI Tools	App for Emotional Help
Moodfit	Moodfit is an AI-powered app that tracks and evaluates users' feelings. It can assist users in seeing trends in their moods and creating emotional regulation plans
Happify	Software called Happify uses AI to assist users in increasing their resilience and happiness. It provides a range of games, workouts, and activities aimed at enhancing users' resilience, happiness, and overall well-being.
AI Tools	App for Emotional Health
DBT Coach	With Dialectical Behavior Therapy (DBT), which teaches people how to manage their emotions, thoughts, and behaviors healthily, users can practice DBT with the use of an app called DBT Coach.
Companion	With the aid of this app, users can engage in cognitive-behavioral therapy (CBT), which teaches individuals how to recognize and alter unfavorable thought patterns and behaviors.
AI Tools	Smart Tools for Psychological Wellbeing
Kintsugi	By using facial and voice analysis, Kintsugi helps therapists identify emotional distress early on by giving them real-time emotional feedback.
Watson Health (IBM)	By evaluating extensive patient data, Watson Health by IBM uses AI to forecast how a disease will advance and how well a treatment plan will work.
Cerebral	With the use of artificial intelligence, therapists at Cerebral can better tailor treatment regimens for individuals suffering from mental health issues.

Diagram-1: AI in Diagnosis for Mental Healthcare



Artificial Intelligence has shown great promise in the early identification and prognosis of mental health issues. These technologies are modernizing the scrutiny and management of mental health issues by analyzing speaking, script, facial expressions, and sensor-based health info. Prognostic models are used by AI to recover emotional health generally, tailor treatment strategies, and strengthen early intrusion. The aforementioned diagram illustrates how AI is used to diagnose mental health issues

I. Economics of Sustainability in Mental Healthcare

The sustainability of mental healthcare economics is a complicated issue, entwined with public policy, social determinants of health, and the economics of healthcare in general.(Folland,2024)The economic cost of psychological illnesses includes-

- Direct costs consist of the price of medical care, prescription drugs, hospital stays, and rehabilitation.
- Indirect costs include early retirement, presentism (lower productivity at work), and loss of productivity as a result of absenteeism.
- Costs to society, include expenses related to drug abuse, homelessness, and criminal activity, which is frequently connected to untreated mental health issues.

But the economic gains from investing in mental health services include:

- Enhanced output, as prompt intervention and care can result in better output and lower absenteeism.
- Lower medical expenses, since proficient mental health treatment can stop or slow the onset of chronic physical illnesses.
- Enhanced economy as a psychologically sound populace produces a more inventive and productive labor force.

However, there are certain limits concerning sustainability.

- Underfunding is one of the factors affecting sustainability. Many nations underinvest in mental health care, which results in a lack of resources and obstacles to access.
- Ineffective resource distribution may occur as the provision of mental health services may be hampered by the healthcare system's misallocation of funding.
- The stigma associated with mental illness can prevent people from getting treatment, which raises expenses and results in less satisfactory care.
- Lack of integration is another factor where duplication of services and increased expenses may arise from inadequate integration of mental and physical healthcare.

Hence the sustainability strategies should comprise the-

- Early intervention since the long-term expenses of mental illness can be decreased by funding programs for early intervention and prevention.
- Integrated care can lower costs and improve outcomes by combining mental and physical healthcare services.
- To ensure proper service delivery, it is imperative to invest in the workforce in mental healthcare.
- Pay-for-performance like reimbursement linked to results might encourage cost-effectiveness and quality enhancement.

- By using data to guide program evaluation and resource allocation, spending can be optimized.

Conclusion

An approach that takes into account social and economic considerations must be used to ensure the sustainability of mental healthcare. Governments, healthcare providers, and legislators may foster a healthier and more prosperous society by allocating resources toward integrated care, prevention, and early intervention.

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