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Breaking Barriers: How Neural Network Algorithm in AI Revolutionize Healthcare Management to Overcome Key Challenges The key challenges faced by healthcare management.

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Abstract— Healthcare is one of the most important sectors of the economy. Quality healthcare is one of the most important factors determining how individuals perceive the quality of their lives. Further, healthcare has become a major political issue within different countries. Delivery of quality healthcare is, therefore, a major determinant of the national identity. However, healthcare is one of the sectors facing a number of challenges that need to be addressed. All healthcare economies are going through the same issues across the world. Introducing new technologies has further led to more challenges in the healthcare sector. Through AI, data analytics is available which will ensure that solutions to the challenges are found. The disruptive technology introduces more patient power, which has resulted in many issues in the healthcare sector. Therefore, the main concern of the essay is to present some of the challenges facing the healthcare sector. Also, it will address how disruptive technology can play an important role in ensuring that the challenges are being addressed to enhance the quality of care.

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There have been increasing concerns about how to leverage the challenges the healthcare sector faces. Many authors have been interested in studying the concept and establishing various contexts that must be addressed. The healthcare sector is affected by several issues which implies that there must be effective strategies in place to address them. For instance, Tortorella et al. (2020) investigated the challenges in the healthcare sector. Among the major challenges identified by the authors were increased public opinion in healthcare, increasing costs, and the

Changing nature of chronic conditions. This implies that there are challenges and a need to ensure they are addressed.

I. CHALLENGES FACING HEALTHCARE.

Rising costs

Cost is one of the bigger challenges that the healthcare sector is facing. Increasing prices on healthcare services and products has a lot of implications on how patients perceive the quality of the services received. Spending on healthcare is growing faster than the GDP, meaning that the costs are rising over the income of individuals within the economy. Treatment of chronic conditions is expensive, which is one of the major causes of disparities within the healthcare sector (Sajjad, 2015). The providers of healthcare services are being faced with a lot of factors within the economy. Most economies lack insufficient funding and the aging populations. This means that economically active individuals will have to pay for their medical expenses. The aging population depends on the working population. In most cases, the aging population does not work and is easily affected by chronic conditions. The adoption and penetration rates of clinical information systems vary greatly. The number (and size) of buyers varies from country to country and is not necessarily dependent on the size of the land but rather on the structure of the healthcare system. The graph below shows healthcare expenditure in the United States,From the above graph, healthcare costs are rising because of several factors, including the increase in the number of healthcare conditions among the population in the US, increased use of expensive technology in healthcare, and poor healthcare plans. These factors also are believed to increase the costs of healthcare.
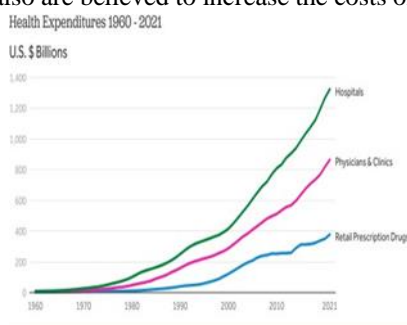

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Fig. 1: Healthcare spending (Sajjad, 2015)

Leveraging costs and the provision of healthcare services is difficult. The increasing provision costs imply that it is difficult for some other populations to access healthcare services. Costs associated with taking care of patients are high, especially for those without insurance Coverage. The increasing costs imply that the general quality of healthcare is affected. There are several factors that tend to increase the healthcare costs (Sajjad, 2015). The factors include the inappropriate or overutilization of medical care, regional variation in services and spending,

Administration inefficiencies associated with patient, payer, and provider interface, and the growing uninsured population. These are among the most common factors that are believed to have challenges in the healthcare sector and need to be addressed.

II. ECONOMIC DYNAMICS

Changes in the economy are one of the issues that also impact healthcare management. The economic situation of a country limits healthcare organizations from expanding or even adopting other models. For instance, when healthcare organizations seek to expand, they must also consider the realities within the economies and the limits they must reach to enhance their development. Other factors must also include the strategies different employers have adopted in meeting their goals and reducing costs, the concentration of the payer market, and the alignment of the physician practice (Sajjad, 2015). The changes in the economy may affect how healthcare services are received. For instance, in times of economic depression, it will be difficult to fund for the medical expenses. Economic depression implies that the economy is not functioning to its full potential, and therefore, healthcare payers can fail to allocate the needed money to enhance service provision. Economic dynamics, therefore, have direct implications, and this is a great challenge to the healthcare sector.

III. CHANGING DEMOGRAPHICS

In the current economy, there is increasing demand for healthcare delivery, and this is a trend happening in almost every country. Currently, most people know about different causes of diseases, which makes them live longer. They know what causes diseases and, therefore, can take the necessary precautions to prevent further implications of the different conditions. Also, there have been improvements in the diagnostic techniques and treatments that must be addressed to ensure that they are being handled effectively (Prybil, 2003). Life expectancy is currently at 80 years in most countries, and this continues to lengthen. People are, therefore, living longer with chronic diseases. This implies that the healthcare sector must get prepared to address this

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situation. It subjects them to a burden of treatment throughout the period that they will be living. The lifespan of individuals, therefore, implies that there is increased demand for clinicians and healthcare professionals. Most of the countries will, therefore, be required to absorb a lot of clinicians to meet the healthcare demands of the rising population. Many countries are failing to adopt new graduates, which is having implications for the quality of care (Sajjad, 2015). The enrollment of students in medical schools is a big challenge in most of countries. The best example that can be used in this scenario is France. Arguably, a storm is brewing in France, where the number of doctors over 55 is among the highest in the OECD. With an overall reduction in the number of graduates emerging from medical school, France may see the number of doctors leaving the profession exceeding those entering it. It is generally the case that a skills shortage increases costs (or reduces service quality), so a well-run health system makes sure staff are properly equipped and doing the right tasks for their skills and training. This presents an ethical challenge as some countries seek to fill the gap by recruiting doctors and nurses from other countries, thus depriving those societies of their healthcare professionals.
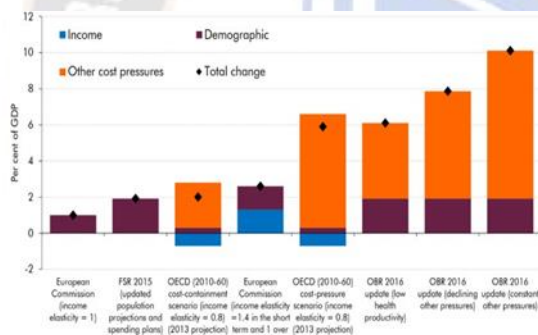

Fig. 2: Changing Demographics (Sajjad, 2015)

IV. ACCESS TO HEALTHCARE

As the demand and spending on healthcare increases, healthcare organizations will be needed to ensure that they enhance the ease of access to healthcare services. This must align with the cost of operating the smaller healthcare organizations. Most countries are facing such
Challenges because, to them, rationalizing the healthcare system will mean that smaller healthcare organizations will be closed (Prybil, 2003). This will create political tension in the country and, hence, more challenges to the healthcare sector. The rationalization must, therefore, take into consideration the increased specialization of tertiary hospitals. Access to healthcare is also being affected by the value-based models that different healthcare organizations are adopting. Most of the leaders in healthcare are seeking to adopt new ways that they can put in place to ensure that they promote healthcare. The value-based model is in place to

ensure that patients are getting the right care services. However, things are changing so fast in the healthcare sector. Most healthcare providers believe that the change in access to healthcare will be affected by this model. In other words, they will reach a point where managing a value-based organization will not be supported by their fee-for-service reimbursement model.Clearly, this implies that access to healthcare services will be affected, which means that a change is needed to handle them effectively.
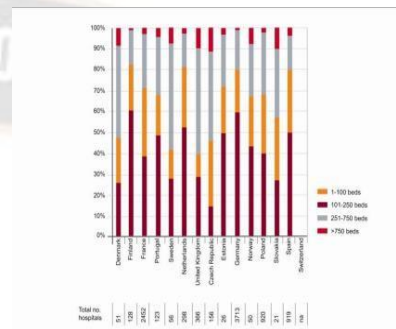

Fig. 3: Access to Healthcare (Sajjad, 2015)

V. COMPETITION FOR HEALTHCARE PROFESSIONALS

Competition is common in the current economy. Organizations are constantly competing for skills that will enable them to reach their goals effectively. In the healthcare sector, there is a rising shortage of healthcare professionals. The shortage of the profession has, therefore, resulted in increased competition for hospitals and healthcare providers to recruit and hire individuals who will give services to patients effectively and efficiently. Competition has created the need to ensure that organizations are focusing on the quality of care services. In the competitive environment, those organizations that do not have skilled labor will suffer more because patients

will tend to seek medical assistance elsewhere. With such competition and the desire to remain on top of others, healthcare leaders are yet tasked with another responsibility to ensure that they are offering competitive pay. Pay and benefits are among the major factors that will attract competitive employee. The most qualified healthcare professionals, physicians, and nursing aids always demand high pay and benefits. Also, work security is an important factor because it will influence how well an organization will attract a skilled workforce. The hiring process must change in accordance with these different needs and trends in the healthcare sector.

The competition for healthcare professionals has made it difficult for smaller healthcare organizations to attract top skills. The reason is that they do not have enough capital

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that will be used to ensure that they are rewarding the top skills. However, most of the patients who do not have enough income to pay for healthcare expenditures choose to use small healthcare organizations. The quality of the workforce, therefore, plays an important role in determining the quality of the services that an individual is going to receive in these facilities. This has made it difficult for the healthcare sector to continue offering quality healthcare. Competition is, therefore, an issue for management in healthcare, and there must be strategies in place to address the increased implications that it has on the general population.

VI. GROWING NEED TO SPECIALIZE

One of the most common current trends is the growing need to specialize. To ensure that healthcare facilities are offering quality services, there is increasing concern about focusing on a particular healthcare problem. For instance, some hospitals are focused on cancer treatment, a trend common among healthcare organizations in the United States. Healthcare leaders and management are therefore tasked with the primary responsibility of ensuring that they are offering the highest quality care through specialization (Oleribe et al., 2019). However, establishing a facility focusing on a single diagnostic category is still a big challenge because it will be difficult to find the workforce to help it achieve its goals. However, it should be noted that specialization is one of the strategies most of these organizations have implemented to ensure that quality care is achieved.

VII. ADDRESSING THE HEALTHCARE MANAGEMENT CHALLENGES

With the increased concerns, it is crucial that these healthcare management challenges must be addressed. The challenges affect the most important sector of the economy; therefore, healthcare professionals and governments must establish strategies to help solve the problems.

The following are different ways the challenges can be addressed and ensure that healthcare services are streamlined to meet its goals.

VII. STAKEHOLDER ENGAGEMENT

Working with other stakeholders is one of the ways healthcare management challenges can be addressed. Stakeholders in this case include the healthcare leaders, healthcare Practitioners in the public and private sectors, and the political environment. Stakeholder Engagement will allow for effectively allocating the needed resources crucial for developing the healthcare sector. For instance, when stakeholders are engaged, several measures, such as Insurance, will be in place. The growing population will be insured, which will help address the increasing healthcare costs. Further, there will be enough funding to train healthcare Professionals to fit well within the work environment, especially when the government is involved. Therefore, it is important to note that one of the steps to addressing the increased healthcare challenges is engaging different stakeholders.

VIII. INCREASING HEALTHCARE TRAINING FACILITIES

One of the challenges that healthcare management is facing is increased competition. Competition for skills and the available healthcare organizations is increasing. One way of ensuring that the challenge is addressed is by having increased training facilities, such as Colleges, that are mainly focused on enrolling students in medical courses. This is a great step that will ensure that there are improved outcomes related to healthcare professionals. Training facilities must be well equipped with the necessary resources to offer quality learning. When nurses are well trained, it implies that they will be equipped with the right skills to ensure they are advancing their service delivery.

Another important context that is crucial in ensuring that the nurses are getting back to school to advance their skills. The main reason behind this is that some chronic conditions are changing, and the only way to ensure that nurses are equipped with the most current skills is to use technology. As stated earlier, technology is changing the healthcare environment, which introduces a new challenge (Tortorella et al., 2020). Therefore, it is crucial for them to have their skills and knowledge base improved, including the expertise and knowledge on how they can handle technological devices that are used in offering care. Research and development should be the key concepts in training facilities. In other words, it is evident that the facilities must take into consideration these changing trends in the healthcare sector and seek ways that they can help improve.

IX. IMPLEMENTING ARTIFICIAL INTELLIGENCE

Artificial intelligence is one of the disruptive technologies that are increasingly applied within the healthcare sector. AI has profound implications for a number of industries. However, the most significant one is seen in the healthcare field. Artificial intelligence is revolutionizing how healthcare processes are being managed and, at the same time, bringing solutions to the Issues and challenges affecting healthcare (Dash et al., 2019). Artificial intelligence is important in analyzing the large amount of data available. There are various ways in which artificial intelligence algorithms can be used to address the healthcare management challenges named above.

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Artificial Neural Network algorithms are a class of ML algorithms that require very little human intervention during training and can process huge amounts of data in reduced time.

In healthcare, applications include analysis of medical imaging; biochemical studies; and text and speech recognition (Girnyak, 2021). The patient information here includes the cost of healthcare, the name, and the insurance status of the patient (Dash et al., 2019). The data would be important in establishing strategies that will be important in handling the different needs and the increasing costs. Through AI, the charges can be made clear, which can later be used to decide how to effectively reduce the cost and increase the number of people covered with insurance. In other words, AI can give real-time data on healthcare costs and how they can affect the quality of healthcare delivery.
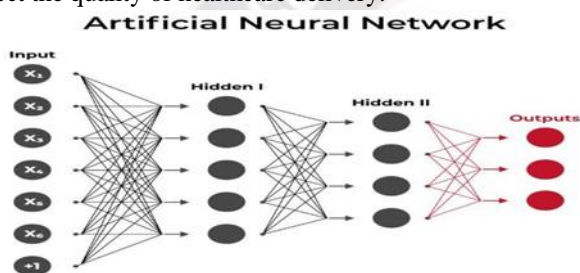

Fig 4: Artificial Neural Network Algorithm (Girnyak, 2021)

Logistic regression is also one of the most commonly used algorithms for medical diagnosis and has been employed in the fields of medicine for a long time. This is a relatively simple method for ML to predict the state of a variable, which is usually binary. Logistic regression is used to determine the probability of an event (whether one has or does not have a disease) and can be applied in solving classification problems (Girnyak, 2021).
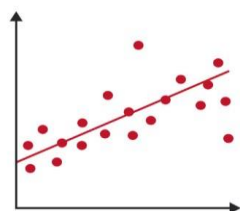

Fig 5: Logic Regression Algorithm (Girnyak, 2021)

AI analytics that can be used is convolutional neural networks which are deep learning models. They are important in ensuring that healthcare challenges are addressed, through the ability to diagnose diseases which is done through imaging. This will ensure that new treatment methods associated with chronic conditions are addressed. It will improve the patient outcomes.

The fourth one is the rule based systems, which are machine learning models, which helps the healthcare professionals in predicting the admissions of the patients and at the same time recommending different treatment plans.

To conclude, healthcare management faces several challenges that must be addressed. Healthcare challenges affect the quality of care and increase the inability to meet the operating goals. There are several healthcare challenges, including rising healthcare costs, competition for healthcare professionals, economic dynamics, and changing demographics within the healthcare sector. These challenges are common, and therefore, healthcare leaders and professionals need to

Have effective strategies that will help address them. Several proposed approaches can be used to manage the challenges. They include increasing the healthcare training facilities, stakeholder

Engagement, and the use of artificial intelligence. Artificial intelligence entails using technology and proposes some evidence-based practices that will promote evidence-based strategies to address the issues.

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