UNIVERSITY OF BIRMINGHAM | BIRMINGHAM BUSINESS SCHOOL

Assessment and Feedback: Student Template

Student ID Number(s): 2659883

Programme: MSc Business Analytics (FT)

Module: Data Management Strategies and Technologies

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Assignment Title: Individual Case Study

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Section Two: In this assignment, I have attempted to act on previous feedback in the following ways: • Analysis • Approach • Quality of work
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Contents

ABOUT THE COMPANY AND ITS DATA MANAGEMENT STRATEGY

EzeRx HealthTech Pvt Ltd was incorporated in 2018 and its head office is in Odisha, India. EzeCheck is a technological innovation that is confined to the health care industry. This product represents the pledge of the organization so as to improving diagnostic health with non-invasive and easily accessible, cheap medical technology for areas with poor people. The main target customers of EzeRx for the products and services are rural and remote residents to whom traditional healthcare infrastructure is either of poor quality or absolutely not present. For this people, EzeRx designed an extremely portable device which is named as EzeCheck and offered the buyers the opportunity to use it for their critical healthcare screening. This is why EzeRx succeeds in the area for dealing with different barriers to entry such as geographical location, economic constraints, and a general apprehension towards invasive medical procedures.

CURRENT TECHNOLOGY AND ADVANTAGES

The approach to this case is EzeRx's data, an advanced Internet of Things (IoT) technology, which allows one to collect and monitor remotely real-time health data from large and distinct geographic areas. This IoT framework ensures that the data collected by the EzeCheck devices and kept using SQL server of its own and then is processed and analysed in time to provide direct diagnostic outputs. This would give them the potential to have early warning signs for diseases, and thus this is very likely to save lives for the people, particularly in rural areas whose response to any health condition is known to be lagging. Main advantage that comes with EzeRx are IoT-based data management. First and foremost, technology scalability quickens EzeRx to adapt to the harshness of diversity in environmental conditions and user requirements, hence allowing them to better reach out and make their healthcare solutions more effective. The second, non-invasive nature of this technique can bring improved ease in data collection with better patient compliance and in general, more relaxed access to some groups of potentially fearful or sensitive patients. Lastly, the real-time data capture and analysis help in active response to health emergencies that allows for timely health checkups.

AREAS FOR IMPROVEMENT

There are few areas where EzeRx's data management strategies can be further enhanced. There is, however, a sensitive security need for the data as the nature of health data protection against breach is very important considering the nature of data and compliance with international rules. Some of the ways through which such security risks may be minimized include better data privacy protocols and use of improved and very advanced encryption methods. It is another aspect that the system will have to improve its analytical skills in data management. Technologies that are available today is able to collect and report data on health. With further developments in data analysis, such information may be transformed into insights on how to proactively manage health. The extensive datasets collected through EzeCheck could be used in predictive analytics for trend findings in health and future outbreaks long before they surface, meaning to take preventive actions rather than reactive responses. For example, the use of machine learning algorithms with AI would greatly enhance the ability of EzeCheck to make diagnoses (Xiao, Rasul, & Vollgraf, 2017). This information could then be fed to algorithms that would help increase their accuracy in anomaly detection while also being used to better predict possible health issues in the future. This way, it would not only explain but also personalize the process of diagnosis through individual health profiles of the users (Eriksson & Stattin, 2023).

ADDITIONAL DATA MANAGEMENT TECHNOLOGY

EzeRx HealthTech Pvt Ltd can significantly enhance the operational capabilities by taking advantage of the use of AI and cloud computing services provided by Microsoft Azure, named as Azure AI and Azure Health Data Services. An update that makes the power of Azure more expansive in the transformative effect on the EzeRx process so as to manage, analyse, and keep secure the health data in line with new advancements in technology for the healthcare industry. Microsoft Azure AI offers different powerful analytics and machine learning models which is designed for health applications, providing EzeRx with the tools to go deep into huge data sets. This helps in the extraction of different actionable insights and the prediction of health trends which is a very important aspect in the personalized caring of patients. The way Azure AI transforms unstructured data to clinician-informed decisions will create an improved patient outcome (Microsoft Azure Blog, 2023).

Besides, it focuses on better integration of various types of health data, which include data from clinical imaging to device-generated data. This will provide a 360-degree view of patient information, facilitate the ability to manage data better, and ensure that pulling this wide range of data forms can be achieved in a secure cloud environment to attain strong capabilities in analytics and reporting (Microsoft News Center, 2023). This is particularly true for healthcare applications since the sensitivity of data is at the highest threshold. Azure provides a broad set of security features that ensure the highest standards of privacy and security in the management of all patient data (Alazzam, Alassery, & Almulihi, 2022). This includes patients' health records, their treatments, and billing accounts, in such a way that it allows the customer to comply with leading regulations like HIPAA, and GDPR. This is key in maintaining trust and integrity among the ways that streamline the management of healthcare data.

Implementation of Azure's technologies in the operations of EzeRx will involve a stepwise process. It is with this understanding that there should be an elaborative integration plan to ensure that it suits the data and operational needs of EzeRx. The next step would be to migrate the existing data into the Azure cloud platform and effectively manage health data from various sources with the help of Azure Health Data Services. It is at this very critical juncture that the base is laid for analytics and health data management. Azure AI would deploy sophisticated machine learning models analysing health data to provide predictive insights of the proactive patient care and operational decision-making that would empower the proactivity of the system and decision-makers (Fukizi, 2023).

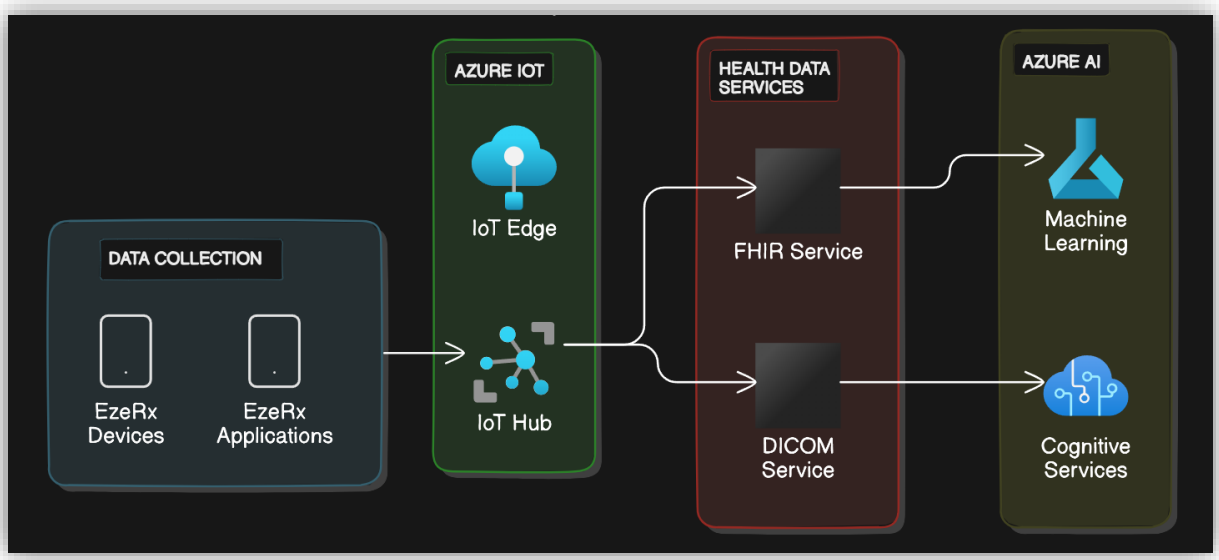
Moreover, to establish a high level of compliance and security of Azure, the system would meet the protection regulations of health data. This would ensure that patient information is not subject to any possible cyber threats. Through the promise that the integration of Microsoft Azure with EzeRx architecture presented, it was a promise not only of improved existing technical ability but the ability to scale with the organization as it grows and matures within the ever-developing healthcare domain. Such solutions would position EzeRx on the leading edge of health innovation, enabling the potential to enhance patient care and operational efficiency significantly.

DATA MANAGEMENT AND BUSINESS PERFORMANCE

The incorporation of Microsoft Azure AI and Health Data Services within EzeRx HealthTech Pvt Ltd will be quite phenomenal in terms of changing the conventional way of dealing with and analyzing its huge health data, thus giving an enormous impact toward the enhancement of operational efficiencies and results of patient care outcomes. With Azure AI, EzeRx will be able to support machine learning to analyze patterns within data and apply that in predicting health trends and better patient personalization of care. This forward-looking approach in health enables EzeRx to anticipate and address health problems before they get to a level that can lead to deterioration, enhancing greatly patient management and care outcomes.

On the other hand, "Azure Health Data Services" allows a solid framework in the management of transformation of many diverse data types of health (Kasthurirathne et al., 2018). These include data from clinical, imaging, and device sources into a common platform following global standards such as Fast Healthcare Interoperability Resources (FHIR) and Digital Imaging Communications in Medicine (DICOM). This leads to the all-important feature for EzeRx in giving an overall view of patient health records, in turn allowing better accuracy and effectiveness of the analysis of health data. Azure offers a complete data governance solution, which includes a whole set of protocols that cover compliance and security, from very wide to very strict rules with regard to healthcare and. This framework would ensure the safety management and the use of all data within the purview of laws and ethics, ensuring the risk involved is least with respect to data breaches and access by unauthorized people. Some characteristics of Azure include secure data interchange, standardizing and integrating all the data to be made uniform and consistent (Madavarapu et al., 2023), and advanced analytics using help from reporting tools in deriving action-oriented insights that have a profound influence on clinical decisions and health outcomes.

EZERX'S DATA MANAGEMENT ANALYSIS FLOW DIAGRAM:



UNDERSTANDING THE ANALYSIS STEP BY STEP:

Data Collection: At the first level of the diagram, data are collected from two main sources: EzeRx devices and EzeRx applications. These devices and applications support processes of data collection that are relative to the health information of the patients. This is an important step because the quality and breadth of collected data have a direct influence on the effectiveness of subsequent analysis and insights.

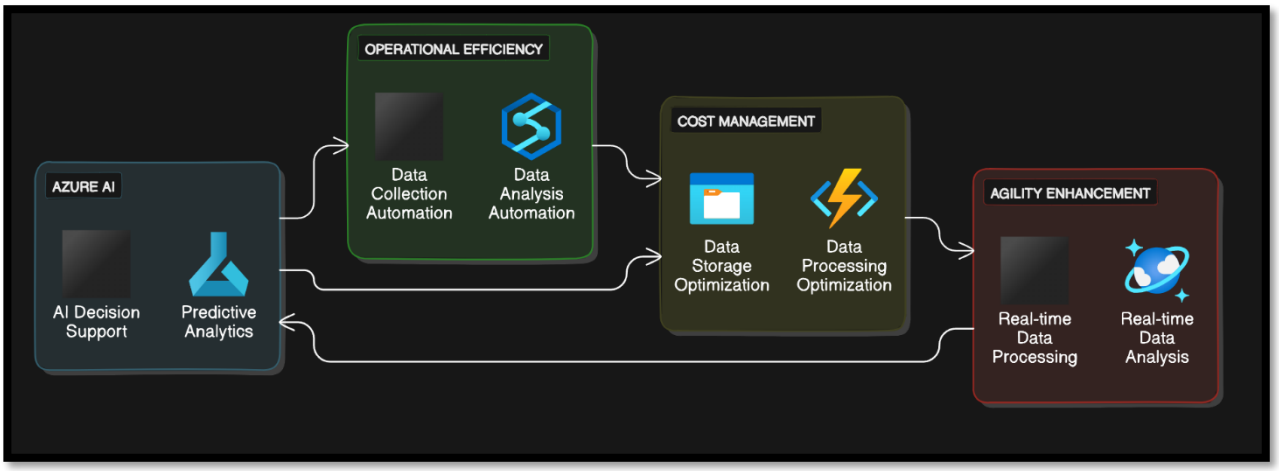
Azure IoT: Data flows into the Azure IoT environment from the point of collection. The first processing is locally done, near the data source, with IoT Edge. This component is the preprocessing of data at the edge level to have lower latency and get a quicker response time. This means that the data is transferred to the IoT Hub as if it was a central node in the IoT infrastructure on Azure. It allows data processing to take place and it is sent in a secure transmission to different Azure cloud components.

Health Data Services: The next one is Azure Health Data Services, which entails FHIR Service and DICOM Service. The FHIR Service will format the data such that a compatible format will allow cross-integration of the varied health systems hence making the process of integration, access, and administration much easier. This service ensures data integrity and coherent data flow among network nodes within these complex datasets; that is, the DICOM service enables proper and efficient storage and access of medical imaging data.

Azure AI: Finally, in this stage of Azure AI, the data is processed and analyzed with the help of various cognitive services, along with applying models of machine learning. This is the stage in which data converts into actionable insights. Predictive analytics for health trends, identifying risk factors, and supporting the cognitive decision-making process—machine learning algorithms are further helped by cognitive services in adding layers of natural language processing, image recognition, amongst others.

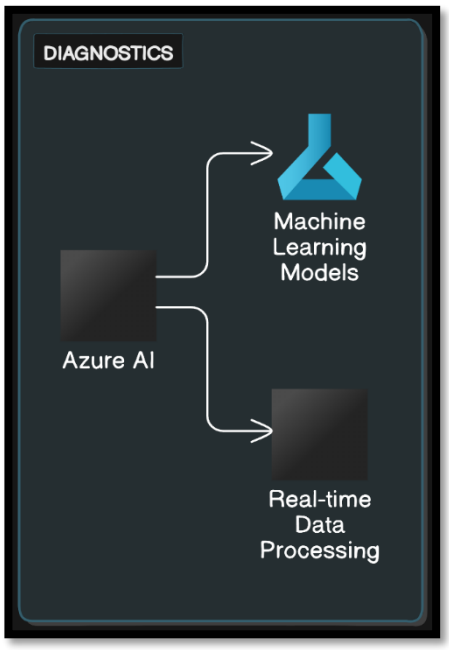
IMPACT ON BUSINESS PERFORMANCE

- **Better Insights with Azure AI:** This will help the firm take quick and well-informed decisions for improving the patient outcomes with more efficiency.
- **Efficiency in operations:** The process of data collection and analysis will be fully automated which will result in less errors and will provide a much faster way of making decisions.
- **Cost saving:** Reduced cost of storage and data processing, which will result in better data management. This will help in identifying healthiness way before with predictive analytics lead to cost reduction, so that expensive treatment and mediation costs can be avoided.
- **Agility enhancement:** Through real-time processing and analysis of data, EzeRx is better placed to respond effectively to the changes in healthcare demands and requirements in the ground of patients. This means improved agility and alertness of the organization.



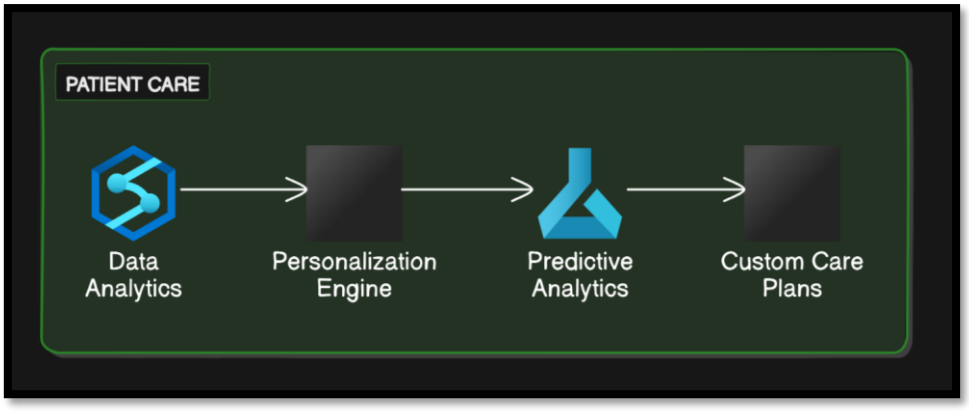
In-depth evaluation of the proposed technology

Potential Benefits of Adopting the Technology

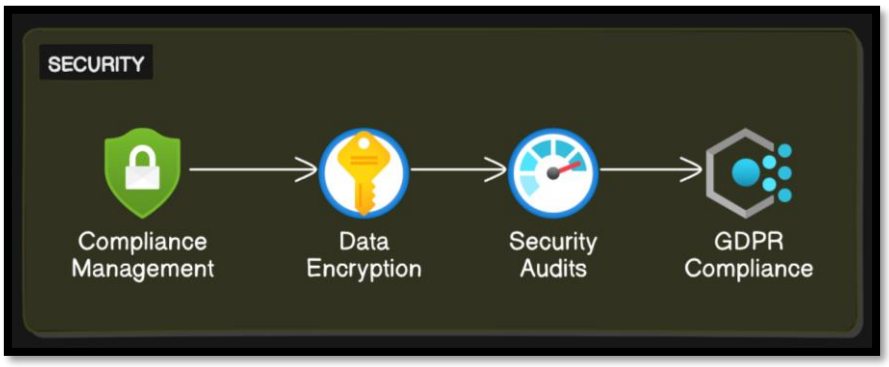


Enhanced Diagnostic Capabilities: Azure AI from Microsoft can transform EzeRx's approach to diagnostics in healthcare. Indeed, with the added value of machine learning models in the analysis of large arrays of health data, the Azure AI will identify intelligent patterns that humans never will. This, therefore, will ensure early detection of such diseases, a critical factor within the remote areas that EzeRx services, and possible means to save lives through treating them before they get out of hand. Another feature is real-time data processing through Azure AI. Thus, EzeRx will ensure that it provides real-time feedback or advice to patients, therefore ensuring more responsive health-related interventions (Shobana et al., 2020).

Personalized Patient Care: This powers Azure AI to conduct sophisticated data analytics and personalization of the health profile for treatments. With extensive patient data, EzeRx can thus offer the right treatment to the patient at the right time with predictive analytics, hence making the treatment effective and hence a patient happy. Customized care plans tailored by Azure AI's insights help the management to find out chronic diseases by predicting outbreaks and adjusting treatments ahead of time, thus improving patient's quality of life. (Kenneth Yamikani Fukizi, 2023)



Compliance and Security Enhancements: Azure adoption ensures compliance with some of the most rigorous global regulations on protecting data, such as U.S. HIPAA regulations for patients and GDPR on European data subjects (Kim & Joshi, 2021). It adds a comprehensive set of securities that ensures the sensitive patient data is safe from all sorts of cyber threats. These includes encryption, regular security audits, and compliance checks. These features would help not only to ensure the security of the patients information but also to build trust for the stakeholder by manifesting EzeRx's commitment toward securing data and privacy.



Challenges of Implementing the Technology

Technical and Integration Complexity: Migration to Azure AI and Health Data Services will present tough technical challenges. It should be integrated so transparently that there is no way data breach is going to happen and at the same time, all systems should communicate without compromising the integrity and security of the data. Most importantly, EzeRx will have to invest in the latest high-tech integration solutions. Thus, most probably modernization of the IT infrastructure in terms of high cost and time shall be incurred. Moreover, staff will need to be trained in the context of a new system, increasing complexity and required resources of the integration process.

Financial Overhead and Ongoing Costs: The initial and continued running costs with Azure AI and Health Data Services still pose a critical concern to EzeRx. On one hand while it brings in company scalability, the other hand financial model of pay-as-you-go can result in unpredictable costs especially with increased data usage. In simple words, budgeting for these expense items basically demands a fairly insightful understanding of the different Azure pricing models and fairly cautious financial planning so as to ensure that the gains accumulated from using Azure are more than the cost.

Dependency on Microsoft: Such reliance on Microsoft Azure, just like any other digital facility, leaves EzeRx open to the sway of outside forces not under its control. This may include the effects of a change in Azure's pricing structure, service downtime, or changes in policy. Contracts are to be carefully managed so that the dependency is achieved, and there should be a contingency strategy in place to ensure that any service disruption can be coped up without having an effect on patient care.

Impact on Work Arrangements and Management Activities

Technological change and changing business conditions are because of the dynamic workforce dynamics, managers have increasingly been the use of Azure AI will change the dynamics of the workforce in a big way (Srivastava, Khanna, & Kumar, 2019). This means that employees will have to be trained on the use of the new systems in a manner that is likely to disrupt the present systems for quite a while, hence low productivity. New roles can also develop while existing ones become obsolete if AI and machine learning take over some analytical tasks, the prudent change management and—in some cases—redefinition of job descriptions and responsibilities.

Data governance and management is an exceptional piece of information. This information in effect means that EzeRx will have to adjust its data governance and management approaches in order to allow Azure. This includes the setting of new protocols on how data should be accessed, stored, and processed to allow the emerging capabilities of Azure, always in line with the law. In other words, managing these changes will require strong governance of the data and continuous training of the staff in new protocols or, once again, with the necessity to recruit specialized people for the management of a complex and safe data system.

According to Shobana, Sabitha and Karthik, 2020, organizational flexibility and adaptability can be the key that would offer EzeRx through both Azure AI and the Health Data Services that would go a long way in ensuring it responds faster to the changes that are taking shape in both the demand for healthcare and what the patients might require. Ideally, this desired flexibility may make the company competitive amidst a health care market that is defined as dynamic. It is also very agile for the organization in their decision-making processes, focusing more on the data-driven strategies that can shake the root of the traditional management style and decision-making processes.

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