NAME: NKWINE INNOCENT, REG NO 2019/U/ISM/00153

No1 Write brief notes on what a Data Warehouse and Business Intelligence is?

With the ever-increasing use of technology in the business realm, it is clear that the companies that properly use their data emerge as champions and in the field of data analysis, there are a lot of terms that are commonly used and two of the most common terms used with respect to Big Data are Business Intelligence (BI) and Data Warehousing,

Business intelligence and data warehousing are similar concepts that operate in the same space, however, the two terms have different meanings as explained below;

A data warehouse is a central repository of data that can be analyzed to make informed decisions. A data warehouse contains multiple databases and within each database, data is organized into tables and columns. Within each column, the data description is defined, such as integer, data field, or string. Tables can also be organized inside of schemas. A data warehouse extracts data from transactional systems, relational databases, and other sources, typically on a regular basis. Business analysts, data engineers, data scientists, and decision makers access the data through business intelligence (BI) tools, and other analytics applications(Taylor, 2022).

On the other hand Business intelligence (BI) is a technology-driven process for analyzing data and delivering actionable information that helps executives, managers and workers make informed business decisions. As part of the BI process, organizations collect data from their internal IT systems and external sources, organize it for analysis, run queries against the data and create data visualizations(Fruhlinger & Pratt, 2019).

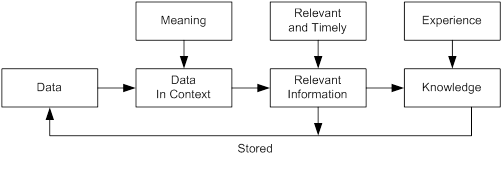
NO 2 Explain the Data to Knowledge Lifecycle: Understand and describe the following concepts:

a) Data

b) Information and

c) Knowledge

The data to knowledge life cycle is the cycle from data, to data in context, to relevant information (specific or general), to knowledge, and back to data when that information or knowledge is stored data-information-knowledge-life cycle involves various stages as indicated in the figure below.

(Brackett, 2013)

The cycle begins with data which represents unorganized and unprocessed facts that have no meaning. Data includes raw numbers, images, words, and sounds derived from observations or measurements for example each student's test score is one piece of data. Data is a raw material for information.

The second stage is data in context which is the raw facts wrapped with meaning. The data in context is then transferred to information which is the set of processed data, it only includes data that possess context, relevance and purpose for example the average score of a class in a test is information that can be derived from the given data.

The information is then transferred to Knowledge which is the information retained with an understanding about the significance of that information. Knowledge includes understanding gained by experience, study, familiarity, association, awareness, and/or comprehension. Knowledge can either be tacit (knowledge that is retained in one’s mind and often hard to explain or transfer to another person) or explicit (knowledge which has been codified and stored in various media like books).

Finally when information and knowledge are stored, they become part of the organization’s data resource and are managed according to data management concepts, principles, and techniques used by an organization.

From the data-information-knowledge life cycle explained above, data, information, and knowledge can be explained as below;

Data refers to unorganized and unprocessed facts that have no meaning. Data includes raw numbers, images, words, and sounds derived from observations or measurements

Information refers to the processed data which has meaning to the user and it involves manipulation of raw data

Knowledge refers to information that is organized and analyzed to make it understandable and applicable for the resolution of problems or the decision taking.

NO 3. Think of at least three sectors where a data warehousing system can be applicable and write a one page brief report on how it could work.

Data warehousing systems are applied in many sectors like banking, healthcare, and hospitality industry.

Use of data warehousing systems in banking sector.

Banking sector is one of the sectors best suitable for the use of data warehousing systems. This is because banks use a wide range of systems which collect and manage larger volume of data and at times it becomes very difficult for banks to integrate data from multiple sources which in turn make data analysis, decision making and business management very complicated(Chan, 2017).

Examples of systems used in banks include; ATM management systems, Visa/Master card systems, e-banking system, loans management systems and many others.

The above systems collect different data which need to combined together in a central location where it can be, interpreted, and analyzed for decision making and in order to achieve that data warehousing systems offer the best option as they allow secure, electronic information storage. A data warehouse system takes data from multiple sources and puts them in a central repository for future and further use.

The data warehousing system could be used in banking sector in the following ways

Capturing Customers’ Data

Gathering and analyzing clients’ data is very critical for banks to improve service delivery and build client relationships. Data warehousing system simplifies this process by capturing and tracking massive volumes of customer data, clients’ interactions and historical information from multiple sources quickly helping the banks to gain insight into what drives customer behaviors.

Data analysis and decision making

Financial institutions use data warehouses for predictive and real-time data analysis as Data warehouses helps to centralize data storage and simplify access to historical data to discover financial data patterns.

This helps banks to discover critical trends to prepare them for future events and make more strategic decisions and detect any fraud information.

Risk management

Competitors and other entities pose certain risks to financial companies. This makes it crucial to streamline data analysis and manage risks through enhanced algorithms. This is due to the data warehouse’s ability to centralize data from multiple sources quickly which speeds up data analysis allowing banks to efficiently understand the behaviors of their clients and make decisions promptly to minimize risks.

Use of data warehousing system in health sector.

Data warehouses are relatively new to the healthcare sector compared to other sectors particularly due to the fact that a data warehouse requires considerable resources to design, implement, and maintain which cannot be afforded by individual health centers or hospitals.

However regional or national health care data warehouse can be established either by the government or large multi-site health center to serve as a centralized repository for all the healthcare information retrieved from multiple sources like electronic health records (EHR), electronic medical records (EMR), enterprise resource planning systems (ERP), radiology and lab databases which facilitates analysis, reporting and strategic decision making among health service providers.

The health care data house can be implemented with different layers i.e.

Data source layer that consists of data from internal and external sources such as clinical data, research data, patient-generated data, and others

Staging layer that act as a temporary storage, where the data from multiple sources undergoes an extract, transform, load (ETL) process and gets combined into a single, consistent body of data.

Data storage layer that acts as central repository for integrated data. This layer may encompass data related to multiple subject areas or departments, known as data marts.

Data analytics & reporting layer that comprises the business intelligence tools for data analysis, as well as reporting which help people in different department to access data that suits their decision making needs(Azeem, 2022).

Once implemented the health care data warehouse can help;

Doctors to monitor the population's health over time and predict epidemics and exacerbations of chronic conditions.

Authorities in health sector to gain insight into how healthcare institutions perform, develop benchmark against which the performance can be measured, and facilitate other administrative operations.

Medical institutions benefit from enhanced reporting capabilities for internal management and external audits, including regulatory compliance checks.

Use of data warehouse system in insurance sector

Insurance companies have different data sources originating from various front-end and back-end transaction systems. Insurance companies are one the companies that use large data especially from the public domain to make their business decision for example they use information about mortality rates, health trends, and consumer behavior to make better decisions for their companies and for policyholders and today big data is changing the way they do this(PathakJan, 2021). While employees used to gather and analyze that information by hand, companies are now using sophisticated technology to gather data from various sources which can be stored in a central location and be accessed easily and in a timely manner and this can help companies to;

Understand trends. By taking information on a large scale the insurance industry can review the information to help determine trends. This can help insurance companies understand risks, price policies accurately, and design more effective products for customers.

Speed up operations. Data warehouse system can help insurers use technology to collect and analyze big data by eliminating the need for manual review conducted by a human and as a result they make data-driven decisions which are more accurate, and less influenced by human decisions and beliefs for example health insurance companies can use data warehouse system to gather data from various sources to verify information shared on customer applications. This data may include data about client’s prescription history, Motor vehicle records, Criminal records, Electronic health records, Professional licenses such as a medical license and more

Ref:

Azeem, H. (2022). *Healthcare Data Warehouse for Data Analytics in Hospitals | Astera*. https://www.astera.com/type/blog/healthcare-data-warehouse/

Brackett, M. (2013). *The Data-Information-Knowledge Cycle - DATAVERSITY*. https://www.dataversity.net/the-data-information-knowledge-cycle/

Chan, C. (2017). *Data-warehouse in Banking industry | by Clement Chan | Medium*. https://medium.com/@clementchan/data-warehouse-in-banking-industry-782031941547

Fruhlinger, J., & Pratt, M. K. (2019). *What is business intelligence? Turning data into business insights | CIO*. https://www.cio.com/article/272364/business-intelligence-definition-and-solutions.html

PathakJan, R. (2021). *7 Uses of Big data in the insurance industry | Analytics Steps*. https://www.analyticssteps.com/blogs/7-uses-big-data-insurance-industry

Taylor, D. (2022). *What is Data Warehouse? Types, Definition & Example*. https://www.guru99.com/data-warehousing.html