DEFINITION OF DATA MANAGEMENT

Data management refers to the development, execution and management of *architectures*, *policies*, *practices* and *procedures* that deliver, control, protect and enhance the value of data and information assets throughout their lifecycles in an organization.

The primary goal of proper data management is to help an organization optimize the use of data within the bounds of policy and regulation so that they can make decisions and take actions that maximize the benefit to the organization.

KEY PRINCIPLES OF GOOD DATA MANAGEMENT

The principles below form the foundation of an efficient data management system.

A clearly defined ***Data management plan***

A data management plan defines the types of data that exist and how they are stored and secured. It also outlines the best practice workflows and quality assurance procedures, including data verification and data validation. Finally, a data management plan describes the generalized outputs or data uses and how the documentation associated with the entire system is managed. It is a blueprint that specs out how the foundation gets laid as well as how each floor is added on top of the foundation.

Implementation of ***Data lifecycle control***

From the time data is collected or acquired until the end of a project and even beyond, we need to have a clear understanding of how the data is being managed in order to maintain the data quality and usefulness. Thinking about the lifecycle of our data allows us to store, validate, and manage the appropriate data and also gives us guidance on when to archive or delete data.

Identification of ***Data ownership and stewardship***

Identifying data owners and data stewards allows us to ensure that the right people are assigned to the right roles within our data management system. We integrate our data management team with our subject matter experts to ensure that data integrity and quality is maintained while also making smart decisions about what information needs to be captured. A data management system is not a black box and ensuring that all team members recognize their role in the data management system enables a collaborative data management approach that avoids silos of knowledge.

*Ensuring **Data security***

In this digital age, data security is vital for every business, regardless of industry. We must ensure appropriate, industry standard security protocols are in place for all systems, including our data management system. This includes both infrastructure security measures as well as adhering to best management practices regarding user access and authority to access various types of data within the system.

*Maximizing **Data usefulness***

None of the other data management principles matter if a company doesn't maximize the use of the data it collects. Data has no value unless it's used, so organizations need to ensure that data is accessible and usable for anyone who needs it. Collecting data for the sake of possessing it doesn't do anybody any good. By maximizing the use of data, organizations can better harness its power and reap its benefits.

*Ensure **Data quality***

Data increasingly guides how successful companies make choices. Hence, it is critically important to guarantee decision- makers can trust the data they work with. To manage data quality, organizations should ensure that they understand stakeholders' requirements for quality and measure data against these requirements. Whether working within a formal data Quality management framework or establishing internal company-specific data quality standards, it is vital to establish the level of data quality required for various decision-making scenarios.

*Collect and analyze **Metadata***

Data that describes another set of data is called metadata. Managing any asset requires having data about that asset (number of employees, accounting codes etc.). It gives data users a deeper understanding of a data set. It tracks all aspects of that data such as how it has been collected and analyzed, giving insights into the content, characteristics, uses of the data. Because data cannot be held or touched, to understand what it is and how to use it requires definition and knowledge in the form of metadata. Overlooking or ignoring metadata can diminish the quality and value of data, which is why companies must develop a detailed approach to managing metadata that complements the data strategy.

DATA MANAGEMENT PROCESS

*Step #1-**Defining a data architecture***

A data architecture is designed and deployed, with database systems and other types of repositories for an organizations data. This helps to define all databases and data tools that you want to use as an organization as well as knowing where your data will be stored and how your data is related.

*Step #2-**Assign responsibilities***

Be clear about who is responsible for each step. Decide which people in your organization will be in charge of capturing specific data. A lack of clarity in a group's roles and responsibilities often leads to poor data quality or uncertainty about the data.

*Step #3-**Define how you will name things***

Define standards for naming files, and decide how changes will affect a file's name. this helps a user figure out what the file is for and what data it holds just by looking at the name.

*Step #4-**Collect data***

Once you define what data you need and what output you expect then go ahead and collect your data through suitable means. This could be through; Surveys or questionnaires to gather insights about product trends, Customer or employee interviews so you can better understand their needs, tracking user behavior when using an application to improve the layout or flow of your site.

*Step #5-**Prepare data***

This is the first part of data manipulation. Data is validated and checked for accuracy. The outcome of the data preparation step should be a dataset that you can use for further processing. A dataset often includes data from multiple sources.

*Step #6-**Process data***

Involves converting the constructed dataset into data that a specific piece of software can understand. Includes tasks such as; formatting data, sorting, editing, merging, back up etc

*Step #7-**Analyze data***

Involves using specific software to examine the dataset with intention to collect meaningful results. For example, using a computer program to find patterns in customer

behavior. When you've analyzed the data, those results can help you improve existing services or processes. For example, you might find out that customers actually want a functionality that you haven't previously offered

*Step #8-**Interpret data***

This helps your business document all the previous steps and their results. Gathered results can be summarized into a report, video, or presentation.

*Step #9-**Share your documentation***

It is important to share documentation about your data management process with team members. Educate them about the data management process and any new tools so as to fully understand the standards and associated responsibilities.

*Step #10-**Collaborate***

For larger organizations, cross-department collaboration and communication are especially important. For example, different departments might have different data management processes. Therefore, make sure to communicate your processes with other departments that handle the same type of data. Creating a cross-department data management process can further optimize efficiency. This will avoid confusion and uncertainty about data management processes between departments. A cross-department data management process will also improve your data quality.

*Step #11- **Data archiving and disposal***

Data archiving describes the intentional preservation of data in a format that makes it easy for collaborators to refer back to while data disposal is the process of deleting data in a safe and responsible manner. Data archiving helps to lower storage costs and increase security while preserving potentially valuable files. You may choose to dispose of your data once the retention period has passed and you feel that the data is no longer of value or to meet ethical requirements. When the data is destroyed it must be irreversible with no chance of recovery. Paper can be shredded using an office shredder. Extra care should be taken with sensitive or confidential data and a secure paper destruction service bin used. Digital data may be destroyed by deleting or overwriting data, purging magnetic media through degaussing (exposure to a strong magnetic field), or destroying the physical media (e.g. CD-ROMS, DVDs)

IMPORTANCE OF DATA MANAGEMENT

Data is increasingly seen as a valuable ***Corporate asset*** for a business. It provides insights into business performance, operational efficiencies as well as strategic direction. organizations use data to make important decisions, improve existing services, or even find trends that lead to the creation of new products. Because data is so widespread and so valuable, you have to take care of the data you collect. Simply dumping all your gathered data into an excel sheet or database is unacceptable. Instead, you have to treat your data properly which calls for having a data management framework that describes how to collect, process and classify data. The data management process will help to improve the quality of your data hence raising your organization's standards and keeping them constantly high.

Every enterprise is affected by governmental and industry regulations, including regulations that dictate how data is to be managed. ***Data regulations*** are shifting constantly and dramatically, adding and tightening requirements for businesses. There is an increasing number of regulatory compliance requirements, including Data privacy and Protection laws. As a result, the increasing regulatory pressure requires a particular attentiveness to stay ***compliant*** otherwise failure to comply can lead to major fines and remediation costs due to data breaches. Part of proper data management requires businesses to monitor and ensure regulatory compliance. It is crucial for businesses to implement adequate controls to monitor and document compliance with data related regulations. Organizations through their business and technical leadership have to evaluate the implications of regulations. They must determine, for example; in what ways is a regulation relevant to the organization, what constitutes compliance, what policies and procedures will be required to achieve compliance, when is compliance required, how and when is compliance monitored, can the organization adopt industry standards to achieve compliance, how is compliance demonstrated, what is the risk of and penalty for non-compliance, how is non-compliance identified and reported, how is non-compliance managed and rectified?

Several global regulations have significant implications on data management practices. For example;

- Bodies that set accounting standards have significant implications on how data assets are managed.
- Privacy laws that include local, sovereign and international laws all apply.
- PCI-DSS: The payment Card Industry Data Security Standards (PCI-DSS).

The ever-changing regulations are designed to improve business, compliance and drive profound improvements: namely business growth and risk reduction.

As more and more businesses adopt big data platforms, concern mounts that application development may suffer from the lack of good practices for managing the data powering those applications. Companies are capturing ever large volumes of data and a wider variety of data types, both hallmarks of ***big data*** systems many have deployed. With such developments, it is clear that big data technologies have created a need for new and different data management tools and processes. It should be noted that, without proper data management, such environments can become cumbersome and hard to navigate. For example, on social media, statistics show that 500+terabytes of new data get consumed into the databases of social media sites, **Facebook**, every day. This data is mainly generated in terms of photo and video uploads, message exchanges, putting comments etc. other examples include; Stock exchanges, Call detail records, Government agencies, e-commerce platforms, jet engines, telecom companies etc.

TYPES OF DATA MANAGEMENT

Data security; The goal of data security is to protect your data from breaches, theft, unauthorized access and guarding against accidental movement or deletion. Data security is enforced at every level of data management. It is usually an IT function that creates policies for software, access, backups, storage and more.

Data cataloging; Data catalogs store and organize data based on back-end information, which is metadata. A data catalog details a company's information resources and helps users search through them so they can find the data they need quickly. For example, through a search bar interface that accepts keywords, short phrases, tags or labels OR a business can store inventory information in a data catalog and tag entries with labels that make it easier to find product information. creating and maintaining a data catalog could help make that information more visible, actionable and manageable.

Data governance; Data governance is the process of creating and enforcing policies and standards for data in an organization to ensure its security, protect privacy and meet compliance requirements. Data governance sets all the laws for management of data. To be successful, these policies require comprehensive frameworks that rely on participation from people at all levels of the company. Businesses will usually have a team in charge of data governance to hold the business accountable and make policy updates as needed.

They are the policy makers for data intake, flow and security. They oversee all the other types of data management work like quality management professionals, data stewards, security teams and other people required for data management. As businesses store and use more and more data from diverse sources, including Internet of Things (IoT) devices, data governance programs become increasingly important to improve quality, remove silos, and make data accessible and secure.

Data architecture; This is a visual representation of how data flows through the organization's system. It's a formal process to help you manage the flow of data through a solid data structure. It covers everything from sources of data, storage, processing, compliance to which teams will handle the data. A well-defined data structure will help create an applicable data strategy and identify weak spots that could make it challenging or impossible to handle and use the data effectively.

Data modeling; Data modeling is similar to data architecture, except a data model relates to a specific type of information rather than all of them. These straightforward diagrams show people how specific data moves through the organization, which systems process it and all the involved departments. A data model might examine information related to customers, third- party partners, employees, or any other relevant group, or show which systems store particular types of data within a company. Those specifics make it easier to find the data later and ensure its stored and handled correctly. It's common for businesses to create multiple data models for their various systems.

Data pipelines; Data pipelines are an organization's pathways used to transfer data between two or more different systems automatically. They're essential for getting data to the desired locations after ingestion. For example, you might connect your sales enablement software to your website analytics to bulk up your lead profiles. Extract, Transform and Load (ETL) is one of the most widely used data pipelines, involves pulling data from a database, altering it to meet an organization's standards or formatting needs and loading it into a new location. People commonly use data pipelines to increase productivity, since they can automate many associated processes. They also optimize usability since the data can move quickly from one place to another.

Data processing; Data processing involves turning raw data into actionable insights through a variety of methods. It includes collecting, manipulating and transforming. This can be done manually but increasingly it is being automated to accelerate workflows. Advanced technologies like artificial intelligence and optical character recognition can

process higher volumes with fewer errors than humans working manually. Data processing makes it possible to identify patterns and trends, discover new information, make the most of available resources, improve efficiencies and make better decisions. It can be used to track consumer trends, measure consumer behavior and create customer segments.

Data lifecycle management; Data lifecycle management (DLM) includes all of the processes, policies and procedures an organization uses to manage business data from collection to deletion. Data is separated into phases based on different criteria, and it moves through these stages as it completes different tasks or meets certain requirements. A good DLM process provides structure and organization to a business's data, which in turn enables key goals within the process, such as data security and data availability.

Data integration; Data integration is the process of combining data from different sources into a single unified view. Integration begins with the ingestion process, and includes steps such as cleansing, ETL mapping and transformation. The ultimate goal of data management is to provide users with consistent access and delivery of data and to meet the different needs of all business applications and processes.

Data migration; Data migration is the process of transferring data from one storage system or computing environment to another. An organization can undertake a data migration activity for numerous reasons including; replacing or upgrading servers or storage equipment, moving data between third party cloud providers, moving on- premises infrastructure to cloud-based services, consolidating websites, performing infrastructure maintenance, migrating applications or databases, installing software upgrades and moving data during a company merger or data center relocation.

Data storage; Data storage refers to the use of recording media to securely retain data using computers or other devices. The most prevalent forms of data storage are file storage, block storage and object storage with each being ideal for different purposes.

DATA MANAGEMENT TOOLS

Data management is a heterogeneous, multiplatform process comprising several tools with different objectives, that helps achieve a centralized harmony of data in the day to day running of a company. These tools help to store, process, analyze, protect and discover value in an organization's data. In order to manage and automate the data

management process, organizations use data management tools from all the five categories below;

Cloud Data Management tools

Software and technologies designed for operating and monitoring data across cloud platforms. Examples of cloud platforms include Amazon Web Services(AWS), Google Cloud Platform(GCP), Microsoft Azure, Alibaba Cloud, Dropbox, DigitalOcean, Zoom etc. These tools provide flexibility to move, manage and use data across diverse cloud and on-premises environments. Companies that are using CDM tools include, Netflix, Facebook, Gmail, yahoo mail etc.

ETL (Extract, Transform, Load) tools

ETL tools gather and retrieve raw data from disparate sources, convert it into a compatible format that is usable by the target/ destination system or application then copy and load the newly transformed data or data sets from a source file, folder or application to a database or similar application which could be a targeted data warehouse, data lake, database or any other application system. Over all, ETL tools make it possible to migrate data between a variety of sources, destinations, and analysis tools. Examples of ETL tools include; Excel, Covidence, RevMan, IBM InfoSphere DataStage, Informatica-PowerCenter, Hevo Data, Matillion, SAP Data Services, Talend etc.

Master Data Management (MDM) tools

Tools that ensure master data is coordinated across the enterprise for purposes of consistency and accuracy. Master data refers to the core data within the enterprise that describes objects around which business is conducted/data which are agreed on and shared across the enterprise. This data could be about products, customers, suppliers or locations. This enables the organizations to eliminate duplicate records with mismatched data, giving operational workers, business executives and data analysts a complete picture of the business entities without having to piece together different entries. These tools that manage the central and master data of a company, at the levels of business, employees, customers, accounts, operations, regulations and so on. Examples of Master data management tools include; Ataccama, Informatica, Pimcore etc.

Reference Data Management (RDM) tools

Tools used to manage classifications and hierarchies across systems and business lines. Often provided as part (subset) of MDM suites, define business processes around reference data, and help stakeholders populate reference data and manage it over time.

Reference data is the subset of master data that defines the set of permissible values to be used by other data fields. For example; country codes

Data visualization and data analytics tools

These tools help organizations explore, analyze and visualize big data sets, and generate reports and dashboards to extract insights and guide business decisions

Data visualization tools are tools used to graphically represent data using visual elements like charts, graphs, and maps in order to provide an accessible way to see and understand trends, outliers and patterns in data. For example, data visualization tools can be used in politics to come up with a geographical map that displays the part each state or district voted for. In logistics, shipping companies can use visualization tools to determine the best global shipping routes.

Data analytics tools –Software and applications that design a series of charts, maps and diagrams in order to interpret and present data for a wide range of applications and industries. Data analytics tools make it easier for users to process and manipulate data, analyze relationships and correlations between data sets, and it also helps to identify patterns and trends for interpretation. Examples include; Excel, python.

ADVANTAGES OF DATA MANAGEMENT TOOLS

- ✓ They can handle any volume
- ✓ They facilitate global working
- ✓ They eliminate redundancies and omissions
- ✓ They guarantee a high level of security, efficiency and privacy
- ✓ They save on storage
- ✓ They optimize data access

DISADVANTAGES OF DATA MANAGEMENT TOOLS

- ✓ They are costly (to acquire and train employees)
- ✓ Requires specialized personnel to implement
- ✓ Might take a while to implement and adapt to depending on the complexity of your company's data structure.
- ✓ Its time consuming.

DATA MANAGEMENT TECHNIQUES

Inventory your data

Data inventory is a list of datasets with metadata that describes their contents, source, licensing and other useful information. As a business it is important to make a list or a

catalogue of your products, employees, customers, suppliers etc. Many companies store data in multiple locations, for example, in separate databases for each application, along with cloud-based storage apps like Dropbox for easy employee access. Talk to stakeholders in multiple departments to gather this information and begin mapping out where all of your data is currently stored.

Next, you'll need to create a way to track this data. This can be as simple as a spreadsheet or as complex as using a tool to help you create a full data inventory. Start by including where the data is stored, its purpose, the file type (for example, you may have a bunch of Excel spreadsheets full of customer data), subjects or keywords for the data, and how often it's updated. This will help you effectively locate, manage, use and share data.

Review/outline your business goals

Top data management techniques consider what you want to get out of your data and how it aligns with what you want from your business. For example, do you want to create or improve automation and processes, or do you want insight into customer buying habits and patterns? In other words, what you do with your data needs to align with your business goals. Knowing what you plan to do with the data you collect can help you to keep only the data that is relevant to your goal, ensuring that your data management software doesn't get overcrowded and unorganized. Review your data management plan regularly to ensure it still meets your company's needs.

Make data protection and security your top priority

In today's world full of hackers, viruses, ransomware and other internal and external threats, businesses must be able to effectively secure their data. Confidential data is increasingly being copied to (or created on) employee hard drives, mobile phones or removable USB drives and because these devices are mobile, they are prone to loss, damage or theft without proper encryption, password protection, data backups. Encryption is one of the most effective techniques for keeping your data secure. Encrypt your data both when it's in transit and at rest, with decryption keys stored separately. This will help to deter hackers. In addition, limit who has access to your data by creating role-based user accounts. Make sure employees and partners have access to enough data to do their jobs effectively but not full access to all company data. Immediately revoke access to data when an employee leaves the company. This can be done by immediately disconnecting the Ex-employee's company accounts such as email account. Require everyone to use strong passwords that include uppercase and lowercase characters, numbers, and special characters. Put the right people in charge of your data and ensure your team members know how to handle the data they work with properly. Company

servers also need to be "hardened", which means their software must be properly patched to ensure no security vulnerabilities exist and only authorized employees have access to data. Many Regulations come with stringent data security standards. If you handle payment information, you also have to contend with the Payment Card Industry Data Security Standard (PCI DSS). Running afoul of regulations or industry standards can cost your company crippling legal and financial problems as well as damage your reputation. Have a strategy on how to handle any potential data or security breaches. Data management isn't a "set it and forget it" procedure. Regular reviews are also crucial for data security; as external threats only get more sophisticated. These top data management techniques can help keep your data accessible, reliable, and secure.

Ensure your data is readily accessible to your team.

A big part of data management is striking a balance between data security and easy access to the data your team needs to do their jobs. For example, customer service agents need immediate access to customer data. Set up role-based permissions for data so that team members get what they need without compromising the security of your entire data inventory.

Setup tools to help your employees quickly find the data they need. For example, a natural language interface allows employees to ask, "What percentage of our sales were made on products?" Other helpful tools allow you to easily add role-based dashboards.

Limit your data entry points

The more data entry points you have, the bigger your risk of duplicate or incorrect data. For instance, your customers may fill out paper forms. Team members then have to manually input these forms into your system. They may not be able to read a customer's handwriting. Or perhaps your team members take information from customers over the phone, and they mistype the customer's address. Human error can cause all sorts of data problems, so it's important to consider where your data is coming from. The key to accurately inputting data is to streamline data entry points. For example, you can use JotForm (online form building company) software to create customized forms, including order forms, feedback forms, and contact forms that dramatically reduce the potential for data entry errors.

Update your data frequently

Lately, Organizations are feeling overwhelmed by too much data. They only want what's relevant to make better decisions, but frenzied data collection has swept up data that's irrelevant or redundant along with what's useful. Removing irrelevant data through

"**data cleansing**" frees up much-needed space and reduces the feeling of being overwhelmed. Data cleansing will help to remove data anomalies and unnecessary data. Also, look for tools that can help you validate the accuracy of your data and identify duplicates. List imports and email hygiene tools can help you verify accuracy. As you cleanse your data, report back to the different departments so that they're on board with new data accuracy and collection standards. It's important to always back up your existing data before you begin a data cleansing effort, in case something goes wrong.

Control data backup and recovery

It's extremely important to control data backup and recovery in case the worst happens. Businesses should always be prepared for any potential disaster. Even a minor error can cost you valuable lines of data. There are two ways you can do this: Back up data onsite, which can be costly, or use a cloud-based service. Make sure that whatever you choose will be accessible in the event of an emergency so that you can quickly restore your data and minimize the disruption to your business. An onsite data backup can be on hard drives or servers stored at your location. As you collect more data, you'll need to expand your storage space. Cloud-based backups range from consumer-grade options like Carbonite to enterprise-grade services from AWS and Microsoft Azure, drop box, google drive.

Ensure quality by reviewing and maintaining data

It's important to review and maintain data to ensure you're working with quality data sets. Unlike data cleansing, data maintenance is an ongoing process. Regularly review and verify your data to be certain it's still reliable and usable. Reviewing and maintaining data also makes your database run faster by removing unnecessary files.

Data should be regularly checked for accuracy (before it is used in any analytics or reporting) as old data can become outdated and irrelevant to your business entities. Outdated or stale data should be purged from your data management software often to keep it from negatively impacting your automations, analytics and other processes within your departments. Train all team members who have access to the data about the proper ways to collect and input data. This keeps data from being input incorrectly, thus preventing problems down the line.

Create data documentation users can understand

Data documentation includes data dictionaries, readme files, and embedded metadata. Good data documentation gives users meaning and context so they understand the data and can use it to solve business problems. Your data documentation should explain how

to interpret data correctly. The documentation can vary according to the complexity of the data and the needs of your team. As a matter of fact, Data documentation needs to be in place before you begin collecting data. A data dictionary is necessary to answer key questions about your data.

Ensure data privacy

Protecting data requires establishing procedures for handling data correctly, beginning with how data is collected and stored, regulatory compliance, and protocols for how it's shared with third parties. Data privacy differs from data security in that it deals with your internal processes versus mitigating external threats. For example, good data security keeps hackers from accessing your data. Data privacy makes sure you have permission to share users' information with third parties. Employees will need to be trained on processes and procedures they will use to make sure the organization's data is collected, shared, and used in accordance with the company's policies and applicable regulations. Data privacy has always been a serious responsibility but is now a major potential liability as well. Poor data privacy practices risk serious violations of set regulations. Liability for a major data breach can cost your company financially.

Have the proper data sharing channels available

A key part of your data management plan is enabling data sharing channels. Data sharing is essentially sharing your data with multiple applications and/or users. Most companies share their information with outside partners and suppliers as well as employees. The channels you use will vary based on how your users consume data. For example, executives may want to view data on dashboards to see the overall metrics of the business. Customer care agents may want a list of purchases that a customer has made so they can help that customer. You might use an analytics dashboard to dive into sales metrics or use a CRM system to examine a customer's service call history. You can make all of this data available by integrating CRM systems and analytics dashboards, as well as other systems that employees and partners may use, with your master database. Application programming interfaces (APIs) selectively open up data to third parties, such as your suppliers. An API restricts access to only relevant data and systems while shielding the rest of your data.

Choose the right data storage

How you store your data will affect how well you manage your data. When you choose a data storage solution, you can select on-premises servers, a cloud-based solution, or a combination of both, known as hybrid storage. Cloud storage is an affordable way to store massive volumes of data without purchasing expensive servers. There are also

several on-premises storage types available. Direct attached storage, like USB drives and external hard drives, can be connected directly to your computers. Network-attached storage (NAS) is the central server storage model, where everything is kept on servers and shared across the network. Some companies still use offline storage like optical disk (CD or DVD) backups as well. What you need to keep in mind, regardless of the storage method you choose, is how available your data will be and how secure it is. Look for storage with high uptime (99.999 percent availability), as well as automatic backup and disaster recovery. You'll also need to know how much it will cost to get more storage, as well as how secure it is. This includes how it's encrypted, both when it's being stored and when in transit.

Archive old data to reduce costs

You can archive old data that you need but aren't currently using to free up space and reduce costs. Typical archived data includes older data that's still important to the company or data that needs to be kept for compliance reasons, such as spreadsheets, email, and other communications. Storage meant for data archiving often costs significantly less than storage for active data because you're not accessing the data multiple times a day and piping it through your applications. It also reduces the amount of data you back up, so your backup storage costs will be lower.

Be sure to comply with global data privacy regulations

In the era of globalization, countries all around the world have an undeniable influence on our economy and business operations. The same applies to the way companies function and above all, how they process personal data. Even if you don't target or sell on the global market, make sure your company is compliant with global and local Data Privacy regulations to avoid significant potential fines. If you run an international business, remember to research data privacy and data protection regulations in all countries in which you operate.

Build a company data management team

Equally important as the technology you use to handle your data, is the quality of your data management staff. Whether you have a dedicated team for this or not, the important thing to know is that you need trained and experienced staff to manage data collection (inn accordance with privacy practices), data quality, data protection, data analysis, and implementations. Building a dynamic data management team is an essential part of any business. They must be properly trained and ideally hold corresponding certifications to ensure that your analytics projects deliver both insightful and actionable results, and that your data is properly protected throughout its lifecycle.

DATA MANAGEMENT CHALLENGES AND SOLUTIONS

Keeping pace with regulatory issues, protecting data

Since organizations started considering data as an asset, it has become an attractive target for unethical users. After numerous high-profile data theft cases were reported from around the globe, some jurisdictions enforced privacy laws. These regulations specify the manner in which personal data of individuals can be accessed by organizations. They also make the entity accessing the data responsible for its protection. Data such as employee personnel files, customer transaction history, sales pipelines and trends, capital financial accounting, intellectual property, inventory or any other type of data is key to your business success. Over years many organizations have failed to protect this valuable asset. Data breaches, either at the hands of hackers or employee negligence, are certainly costly but the damage to an organization's reputation and consumer confidence as a result of a breach is truly immeasurable. Regulatory compliance simply means that the acquisition, storage and exchange of data should comply with the industry standards specified for that particular type of data.

Solution: Invest in data management solutions which are designed in compliance with the set standards, rather than looking to deploy ad hoc solutions. Many more jurisdictions are expected to follow suit as long as technology advancements keep coming hence businesses will have to align their data management systems with all the applicable laws.

Storing the data

There's volumes of data and it keeps growing exponentially every day. The more data is collected, the larger is the data storage requirement, yet it's not just about storing this data but storing it safely.

***Solution*:** You can use network attached storage solutions, cloud-based solutions or invest in data libraries.

Handling the access

Given that many companies manage and store large volumes of data, it then becomes a challenge to figure out and establish who needs to access your data, how much access should be conferred to a specific employee, who should have the control over data management decisions?

Solution: Draft a plan about the way your data is intended to be used. For example; your sales department will need the customer history record and transaction records. Your

marketing team will need the data that relates with the market research and promotional and advertising campaigns. Your customers may need the information of the invoices. Once you have identified the possible routing of stored data and decided on the limit of accessibility, then you need to assign administrators (the fewer, the better) and grant them the privileges of regulating and monitoring access controls.

Integrating the data.

With varied structured data, all dispersed across different channels, probably the biggest challenge comes in form of integrating the collected data. For example; The receipt and expense data, stored on one software platform may need to be imported to an accounting platform like QuickBooks. Similarly, customer data gathered from social media channels, google analytics, emails and other modes may need to be integrated together to present it in one comprehensive buyer persona report.

Data is stored across multiple platforms, including data warehouses, unstructured data lakes, knowledge bases, and more, which makes it hard to analyze since it is not in a single format or in a single repository.

Solution: Data must be transformed into a unified shape, format, or model to allow numerous analyses.

Deployment of adaptive technology that can automate relationships between different databases, allowing efficient communication and access between remote and disparate data stores.

The key role of data quality

One of the biggest challenges most companies face is poor-quality customer data. This is attributed to basic errors such as out of date and incomplete data, duplicate data, spelling mistakes and data in incorrect fields.

Solution: Automation of data validation processes. At a time when good quality customer data and operational efficiency are high on the business agenda, there is clearly a need for companies to find new ways to automate the continuous cleansing and validation of customer data. Data quickly goes out of date hence databases need to be regularly cleaned if they are to remain current and useful.

Constant increase in data volumes

Due to advancement in digital technology and the emergence of cloud storage, organizations have been able to get new insights into their operations. However, the constant increase in data volumes has led to databases being flooded with useless and

duplicate information. Businesses also struggle to keep pace with the discovery of new elements and are often late in making thorough assessments.

Solution: Enterprises will have to tighten their ingestion procedures and make sure that only valuable items are granted entry. This will help control the flow of information and ensure only good quality data is stored.

Growing popularity of cloud makes governance difficult

Most businesses have sought out cloud as a solution to cost effective storage. However small firms usually opt for public clouds which are shared environments or hybrid and private clouds which are partially shared.

Solution. Organizations have to ensure that their assets are safeguarded from unauthorized access. They have to make sure that their service provider has an efficient mechanism in place and follows the industry best practices.

Internet disruptions

Internet disruptions can affect businesses that fully operate on cloud or that are internet based. Such companies that need the internet to run loose out on business when the internet is down because clients are unable to access their services thus hindering the data management process.

Solution: Use USSD (Unstructured Supplementary Service Data)- a protocol used by GSM cellphones to communicate with their service provider's computers via text messages. This does not require internet connection. USSD codes work across all your cellular networks. It is not mobile software or SIM based thus users without a smartphone or internet connection can still have access to services offered by internet-based businesses especially when the internet has been disrupted. This means it can run without either and just needs a connection to the GSM network.

BENEFITS OF PROPER DATA MANAGEMENT

Speed in service delivery

Businesses are able to react to markets or competitors as well as serve customers faster due to readily available data. With a good data management system, your employees will be able to access information and be notified of market or competitor changes faster. As a result, your company will be able to make decisions and act significantly faster than companies who have poor data management and data sharing systems.

Boosts productivity

Productivity is key for any business to thrive because increased productivity will lead to increased revenue for the business. Proper data management within the company helps to streamline the data in one neat, organized place where authorized people (sales, production, marketing, accounting team) who need access to it can easily find it. Employees don't have to ask around the entire business about how to find data on a particular lead or customer because they will have an easier time finding, understanding and relaying information.

Employee commitment and hard work

Employees can easily find and understand the data that they need to do their job. This allows your staff to easily validate results or conclusions they may have and be able to defend them with confidence.

Reduced costs

A proper data management system provides the structure for data to be easily shared with others (reduces costs associated with having to collect the same data from scratch), it also protects data from theft which helps to avoid law suits over breach of data, attacks which would push the business to collect the data again from scratch. Avoids unnecessary duplication. By storing and making all data easily referable it ensures you never have employees conducting the same research, analysis, or work that has already been completed by another employee.

Mitigates security risks

Many businesses strive so much to avoid a data and security breach. Since data security is an integral part of data management, you'll lock down your data and avoid ending up in the news for all the wrong reasons. A strong data management system will help protect your data from theft and attacks. It ensures that a business has one safe and secure area where it keeps its data for purposes of protecting it for its various entities (customers, products, employees, suppliers etc.)

Better data compliance

With the regulations and policies around data getting stricter by the day, efficient data storage and management are critical to any business dealing with data. Non-compliance with data regulations may lead to far reaching implications, which include penalties and loss of reputation. Proper data management decreases the chances of security breaches and regulatory non-compliance.

Gain competitive edge

The more customers you have, the more data you can gather, and that data, when properly managed with digital tools, allows you to offer a better product that attracts more customers and eventually marginalizes your competitors.

Improved decision making

The timeliness of business data, combined with business intelligence tools empowers businesses to make quick, informed decisions. This is because employees are able to view and analyze the same and most recent data. When data is streamlined and employees know where to look for it, the quality of their decisions improves drastically.

Boosts customer relationship management

Businesses cannot survive without customers and data related to these customers is critical to every business. Accurate customer data enables sales, service and marketing teams to target specific customers and understand them in a deeper manner. This allows the sales person to have a proper hold of the customer and develop a stronger relationship. Often businesses capture customer data through several tools and sources. Companies that ethically collect, securely store and manage a database of customer information are likely to improve their overall services, processes and products. The value of effective data management can include increased sales, improved customer retention and loyalty, more effective marketing campaigns, stronger customer relationship, customer satisfaction, a wider customer base and more.