Final BI Report Summer

Department of statistics

Hasan Alhwietat

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Business intelligence

Contents

1) Provide background information about the department of statistics: http://dosweb.dos.gov.jo/ and examine what type of business processes and supporting processes the department has or needs in the future. (Department of Statistics, 2022)

The Department of General Statistics was established at the end of 1949 and was subject to General Statistics Law No. 24 of 1950 and its amendments. The department serves as a reference base for politicians and researchers and has begun to provide data on the natural, economic and human structures in order to assess the capabilities and resources available to the Kingdom.

The Statistics Department provides the following:

Providing the collected data, analyzing and publishing it to ministries, government institutions and scientific research institutes, providing universities and students with copies of the statistics stored on the General Statistics website, and communicating with users of this data to know their needs in order to improve and develop statistics.

The Department of Statistics seeks to achieve its goals by implementing its strategic plan, and one of the department's most important endeavors is to support scientific research and facilitate access to information. The Department of Statistics provides analytical reports in various social fields Economic and demographic data and presents them in a simplified and easy-to-use manner. The reports are based on the needs of local and international institutions. The department follows the method of descriptive analysis of data.

Vision department: Effective and effective leadership in the Jordanian statistical system.

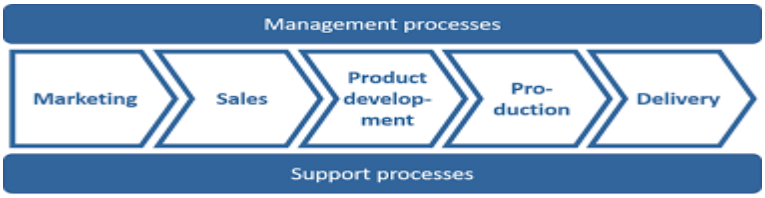
Mission department: Data analysis and dissemination using the best-improved techniques and the application of best international statistical practices and methods to meet the needs of stakeholders and improve the performance of the components of the Jordanian statistical system.

Business Processes: It is an activity or group of activities that achieve a specific organizational goal. The goals must be purposeful and specific as possible and produce consistent results.

Type business processes: - (type business processes, 2022)

- **Core (primary) processes: It is the strategically important operations of the company, which form part of the core business and whose goal is to produce goods or provide services to customers.**

  Examples: 1- Product making. 2- After-sales support. 3- Marketing your product.



- **Support processes: All operations whose sole purpose is to ensure the functioning of the main and comprehensive operations of the company and make it possible to carry out the basic operations and enable the company to present its final product.**

  Examples: 1- HR. 2- IT. 3- Financial Department.

- **Management processes: It is a series of basic steps for managing any task or project in order to achieve the best expectations and results in accordance with the defined vision and strategies. It includes steps to plan, organize, command and control the core operations and support operations on an ongoing basis to ensure the company's ability to meet business requirements to the maximum extent possible, ensure the continued overall efficiency of the business, address any threats and ensure the efficiency of the work. The goal is to optimize income and survival.**

  Examples: Budget and Governance

Supporting processes, the department has need:

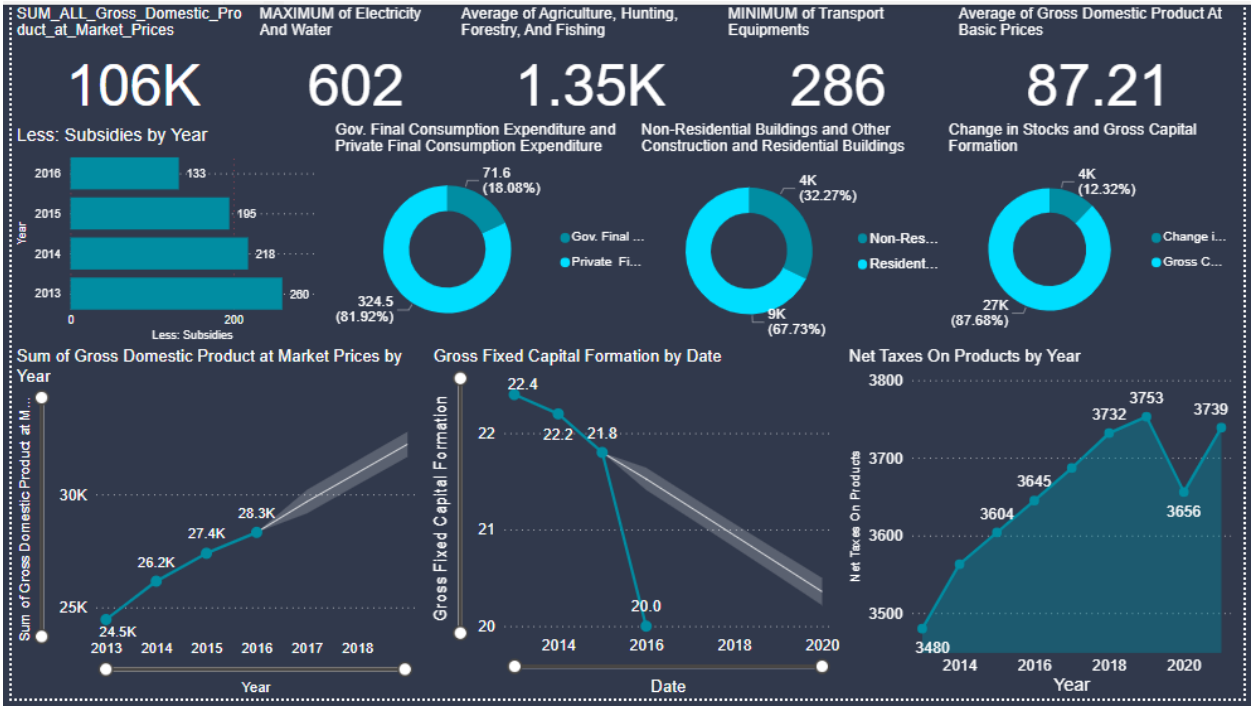
1- HR: It is responsible for managing employees, such as hiring, training, and dismissing employees. The human resources department needs to understand the needs of the organization and ensure that these needs are met.
2- IT: Supervising and documenting information.
3- Financial Department: a unit responsible for obtaining funds on behalf of the company, controlling income and expenses, and managing the business effectively.
4- Technical support: It is a set of services that the company provides to the customer, such as tourism statistics, so that it provides technical support to customers in case they encounter some problems.
5- Call center: It is a center that receives incoming and outgoing calls in the company, providing assistance to customers and dealing with their inquiries.

Supporting processes, the department has needs in the future:

1- Cyber security: It is the application of techniques and controls to provide security for the company and prevent any security breaches that may occur, for example, protecting the collected statistics from being changed or trying to destroy them.
2- Artificial intelligence: It is the simulation of human intelligence processes through machines. This can be used in the company in the future by creating smart systems to collect and process statistics so that they target specific data and can also be used to analyze the collected data and also use it in future predictions.
3- Business process improvement: Develop and improve the collection of data and the way it is presented to customers. An organized system for implementing improvements can inspire teams and company managers by defining the type of data you want to collect from all different areas.
4- Onboarding process: A well-developed and structured method can be used to welcome customers and educate employees so that the company gains satisfaction and helps attract many valuable customers and employees.

2) Explain in detail how would your analysis per each data set help make decision makers from different sectors in Jordan reach informed decisions and improve the overall progress and success of their businesses or companies? Provide the main conclusions and clear examples that you found from your analysis and dashboards.

The analysis helped us to know the thinking of Jordanian companies in the processes of increasing sales, making appropriate decisions and a high ability to predict the future based on strategies and plans that companies follow and the way to market products. The analysis helps to know the desire of customers and determine market requirements.



First, the card: Help us summarize some data and understand. For example, the first card displays the total GDP at market prices over the different years, while the second card displays the highest value of electricity and water, and it was in the year 2021, and this indicates that the percentage will rise in the future, looking at previous years, while the third card Which displays the total rate of cultivation and hunting in forests and fishing over the different years, as for the fourth card, which displays the lowest price for transportation equipment over the years, and the fifth card displays the rate of GDP at basic prices, which shows a high rise in prices.

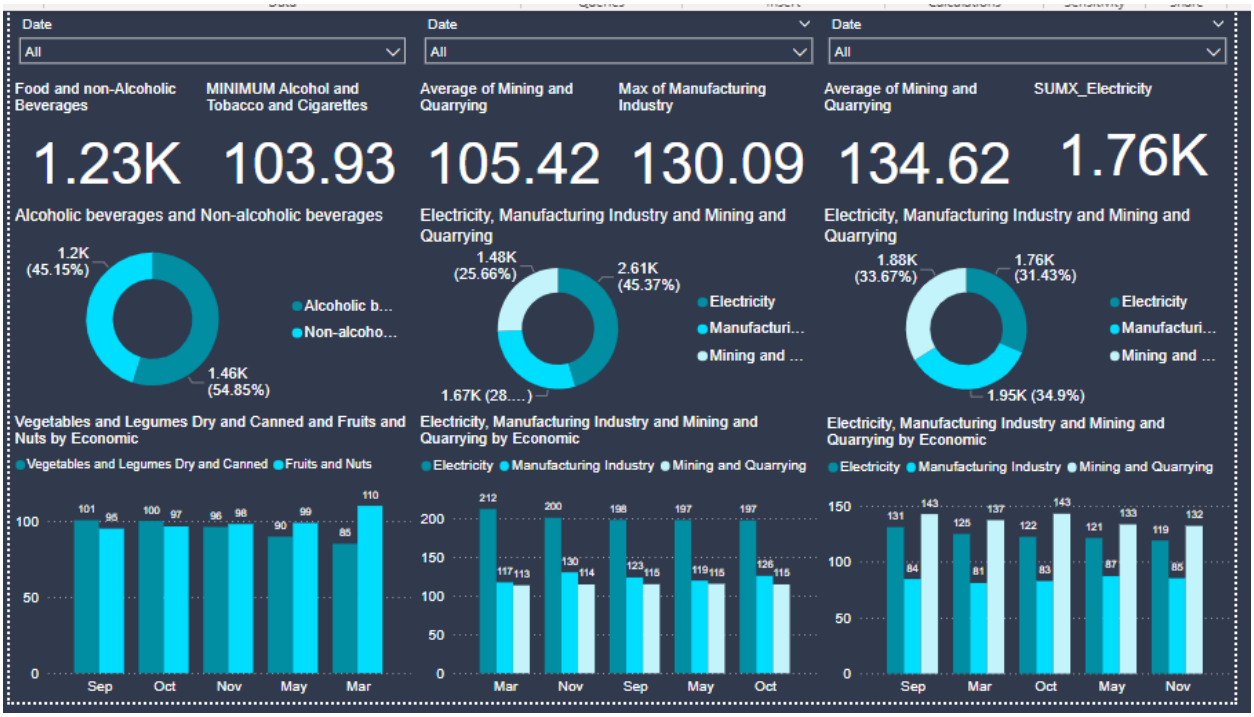
Secondly, the bar chart: It is a graph that represents the data in the form of rectangles, the length of each of which varies according to the values. For example, it displays minus the subsidies for the years. As we can see, the percentage of subsidies decreases with the progress of the years, and this means that with the passage of years there may be no need for subsidies.

Thirdly, donut chart: It is a graphic circle that displays two or more features and shows their values and the percentage for the whole. For example, the first donut presents government consumer spending with spending and private consumption. We also note that the percentage of spending for the private sector is greater, and this indicates that the private sector is much more successful, and the second

donut presents residential buildings with non-residential buildings, and we note that there is a problem in looking at the percentage of non-residential buildings, which is 32 % This means that there is investment in construction, but people cannot buy new housing due to lack of ability. As for the third donut, it displays the percentage of change in the stock with the formation of the total capital. We note here that the change in the stock affects the total capital formation.

Third line chart: It is a line chart that displays data on a series of continuous points and is used for forecasting. For example, the first figure displays the data on the GDP over the passage of years and also predicts what may happen in the coming years, while the second figure displays the constant capital formation data over the passage of years and an expectation of what will happen to capital formation in the future.

Fourth, area chart: It is the same as a line graph, but the area is misleading and is used to represent totals over time. For example, the last figure, which displays net taxes on products over the years.



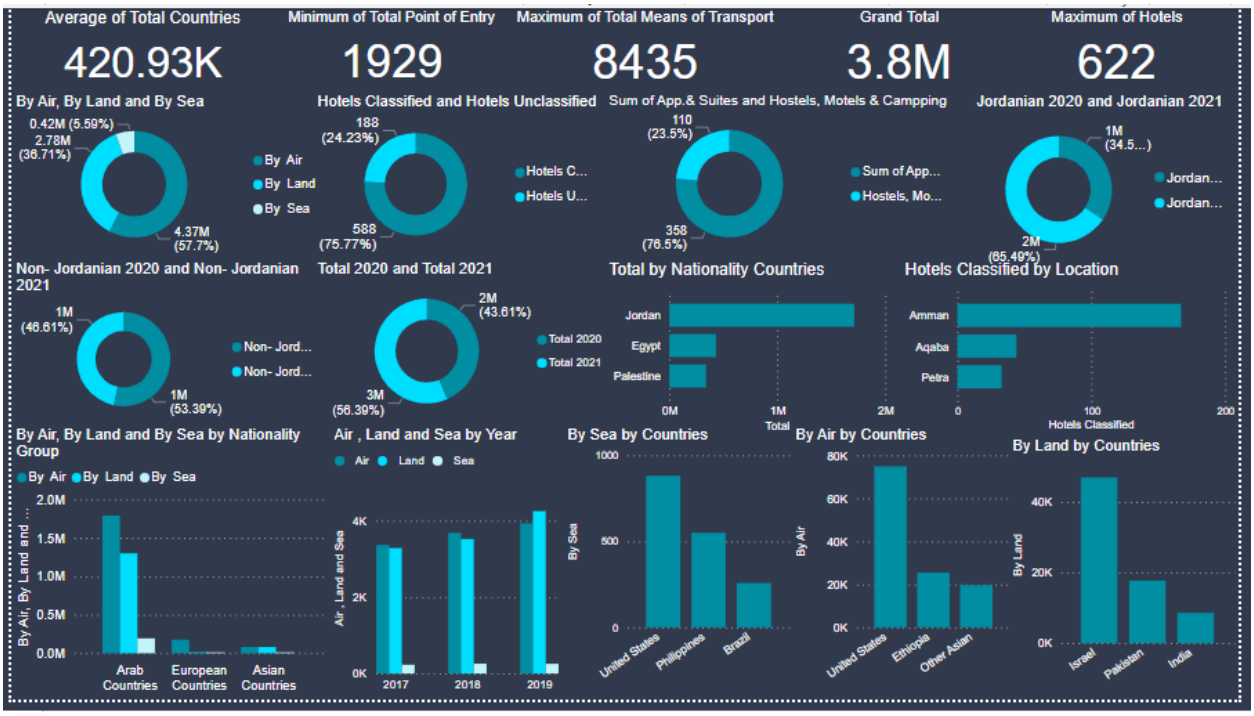
First, the slicer: It is used to change options, such as months, years, etc. For example, it was used to specify the months that you want to display in figures.

Second card: the first card displays the total food and non-alcoholic beverages across all months, the second card displays the lowest value for alcoholic beverages, tobacco and cigarettes, the third card displays the average prices of producers for the extractive industries, or the fourth card displays the highest prices of producers for manufacturing industries for the months, the fifth card displays The average production quantities for the extractive industries over the passage of months, while the sixth card displays the total production quantities of electricity over the passage of months.

Thirdly the donut chart: the first donut displays the prices of alcoholic beverages with non-alcoholic beverages, and we found that the ratios are very close, while the second donut displays the ratios of producers' prices for the manufacturing, extractive and electrical industries, we found the highest

percentage of electrical, and the third donut displays the production quantities for the extractive, electrical and manufacturing industries, and we found that the ratios are close However, given that electricity prices are high, there is a high amount that has been produced.

Fourth, the bar chart: the first form displays the highest five months, the starting prices were high for vegetables and fruits, and we note that the prices are very close, while the second figure displays the highest 5 months, the production prices were high for the manufacturing, extractive and electricity industries, and we note that the electricity prices are very high in relation to the rest of the industries, either The third figure presents the highest 5 months in production quantities for the manufacturing, extractive and electricity industries. We note that large quantities of manufacturing and electricity are produced.



First Card: The first card displays the rate of travel to all countries by different means of transportation, the second card displays the lowest value of the total travel over the years, the third card displays the highest total travel over the years, the fourth card displays the total sum of travels around the world by different means, and the fifth card It displays the maximum number of hotels, which was in 2021.

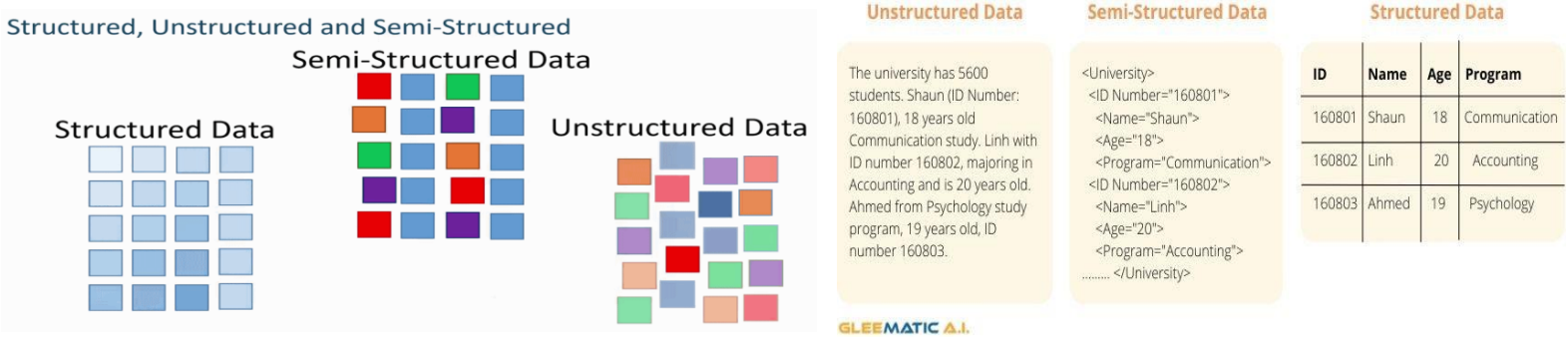
Secondly the donut chart: the first donut displays the means of travel by air, sea and land, and we note that the percentage of air travel is the highest in the world, while the second donut displays the percentages of classified and unclassified hotels, and we note that the percentage of classified hotels is very large, while the third donut displays the percentage of apartments and suites in relation to motels and camps, and we note the percentage of suites and apartments is much higher. As for the fourth donut, it shows the percentages of visiting archaeological sites in the two years for Jordanians. We note that in the last year the percentages were higher. As for the fifth donut, it shows the percentages of visits to the archaeological site in the last two years for non-Jordanians, the percentages are very close in the two years. As for the last donut, it shows the total percentage of total visits to archaeological sites in the last two years.

Third, the bar chart: the first figure displays the top three countries visited around the world, the second figure shows the top three sites of hotels visited in Jordan, the third figure shows the top continents that are traveled to by various means of transportation, and the fourth figure shows the top three years The highest rates of travel occurred in it by various means, as for the fifth figure, it shows the highest countries that are traveled by sea, and the sixth figure shows the top three countries that are traveled by air, and the last figure shows the top three countries that are traveled by land.

3) Examine the types of data (unstructured, structured, and semi-structured) provided by the department of statistics.

Data: They are different types of information that are formatted in a special way, and the data have different forms such as numbers, texts, etc.

Data types: - (type Data, 2022)



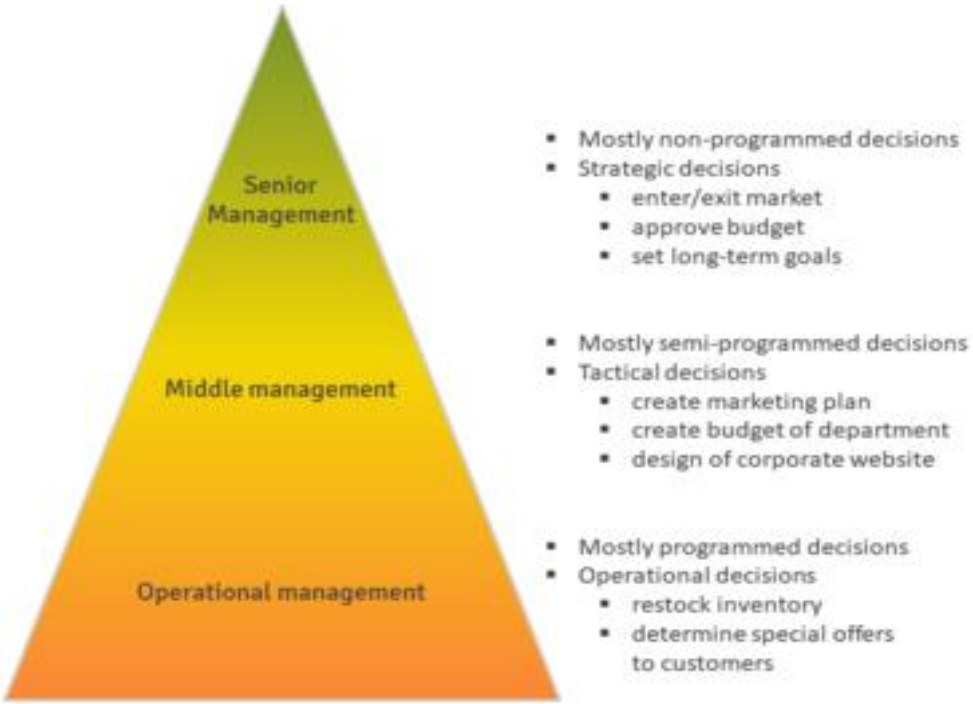
1- Structured: The data is coordinated, has a unified structure, has a specific and fixed arrangement, and can be easily accessed by programs and humans, and this data is stored in the database.
   - Example: Database, Excel.

2- Semi-structured: It is data that is not related to the database and does not correspond to the data model and contains some elements of the structure. It is not static like organized data. This data cannot be stored in rows, columns or databases because it contains metadata that is organized hierarchically and is difficult to manage and difficult Software has access to it.
   - Example: XML language data, emails, zipped files, web files.

3- Unstructured: It is data that is difficult to identify because it has no structure and cannot be stored in any logical way and does not fit into the database and cannot be used easily by programs and does not contain rules or formatting.
   - Example: Images, videos, report, word documents, pdf, Books.

	Structured Data	Semi Structured Data	Unstructured Data
Technology	Relational database table	XML / RDF	Character and binary data
Transaction Management	Matured transaction, various concurrency techniques	Transaction management adapted from RDBMS not matured	No transaction management, no concurrency
Version Management	Versioning over tuples, rows, tables etc.	Versioning over tuples or graphs is possible	Versioned as a whole
Flexibility	Schema dependent rigorous schema	Flexible, tolerant schema	Very flexible, absence of schema
Scalability	Scaling DB schema is difficult	Schema scaling is simple	Very scalable
Robustness	Very robust	New technology not widely spread	-
Query Performance	Structured query allows complex joins	Queries over anonymous nodes are possible	Only textual queries possible

4) Discuss the types of support available for business decision-making at varying levels of the department of statistics department (strategic, tactical & operational)? Compare and contrast them. (type of Decision-making:, 2022)



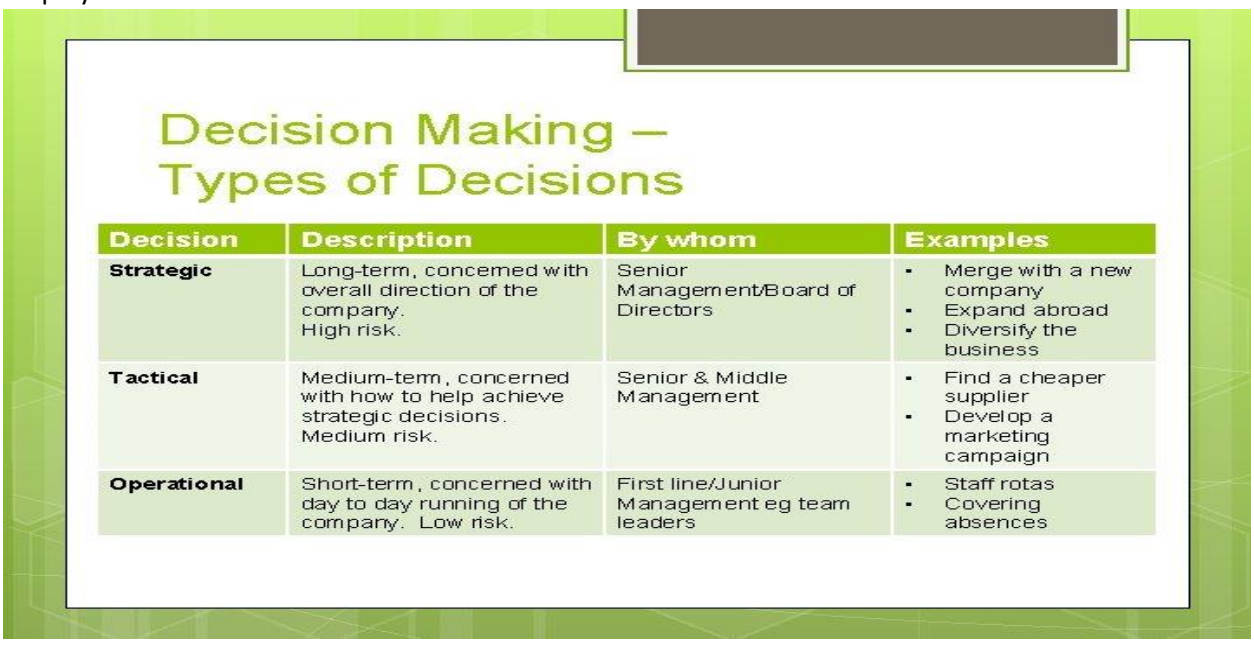
Decision-making: It is the study of how decisions are made, especially with a group of people. The goal is to achieve business goals to meet the requirements and needs of stakeholders. This is done by anticipating results and determining the best option for the company to solve a particular problem.

Outcomes associated with uncertain events are specified so that only one of them occurs, either quantitatively or qualitatively.

1- Strategic Decision: These decisions constitute the highest level of organizational business decisions and are less frequent. Decisions are taken by executive managers and their impact is huge and far-reaching and their expenses are large. The decision is made only after analysis and careful evaluation, so decision-making needs a long-term time that can be more than 5 years and complicated.
Example: Choosing a specific type of statistics to implement, a small statistics company to acquire, hiring additional employees with high data collection capabilities, and Choice of appropriate technology.

2- Tactical Decision: They are semi-structured decisions, and they are more recurring on a weekly or monthly basis, and fall into the middle management level. Sometimes they relate to strategic decisions, and their impact is medium in terms of the risks to which the company is exposed, which affects the profits, and it is less complex and requires a medium-term time.
Example: Determining reference books that were used during data collection, employee work schedules, reorganizing departments.

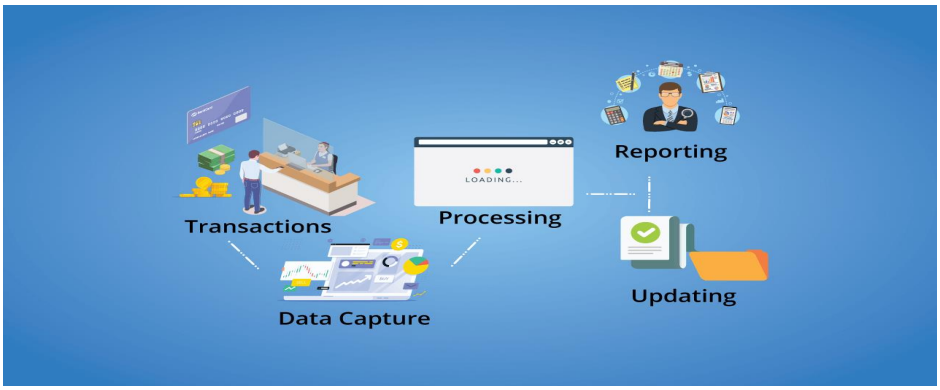
3- Operational Decision: They are frequently organized decisions that occur on a daily basis and have a low impact on the company. They are rather routine and simple decisions. The owners of these decisions are usually junior managers and relate to the daily activities of the organization and based on facts.
Example: Answering customers' inquiries, agreeing to display statistics, and giving rewards to employees in view of their success.



Transaction Processing System (TPS): (TPS, 2022) (operational level)

It is an information processing system for commercial transactions that collects, amends and retrieves data and includes all activities that need to retrieve all transactions. It is a reliable and effective system and its characteristics are performance, reliability and consistency. It is a real-time and easy-to-use processing system.

Example: Hotel reservation or airline ticket, Cheque Clearance.



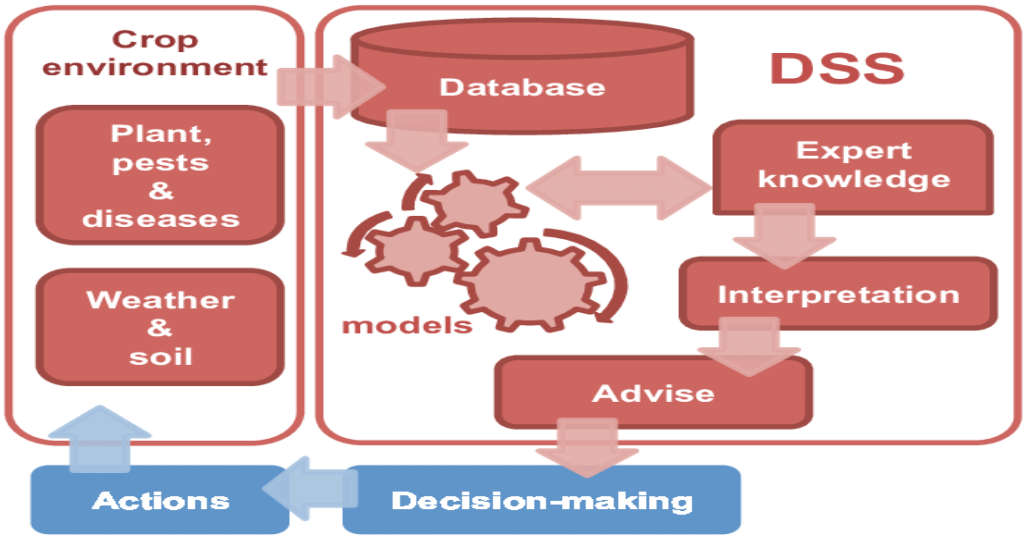
Decision Support Systems (DSS): (DSS, 2022) (Tactical level)

It is a computerized program used to support decisions, judgments and workflows in the company. This system analyzes large amounts of data, allowing the collection of comprehensive information used to solve problems and in decision-making. This system makes more informed decisions, high efficiency in dealing with problems, and has the ability to plan and manage.

This system is used by middle to senior management, enabling them to make semi-structured and unstructured decisions.

DSS increases the ability to make the right decisions and immediate response.

Example: It is used to forecast statistics after six months based on assumptions, and to create alternative results for baseline results and other data related to inventory or operations.



Types DSS: - (DSS types, 2022)

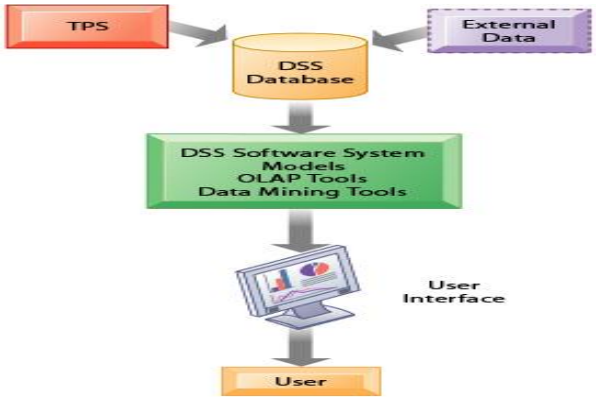
1- Model-Based DSS: It is a complex system that helps in analyzing decisions and choosing the best option. It is used by managers or company employees for a number of purposes depending on how the model is prepared. The system can be used across computers, servers or the web. Supported by model theory and interface such as scheduling, statistics, and financial reporting.

Assumptions & Forecasts: best guesses, time, risk through what if.

USES: Forecasting decisions, Budgeting decisions, Resource allocation decisions.

2- Data-Based DSS: Most decision support systems target and depend on employee and supplier data to analyze a data set. It is used to query the database or data warehouse to search for specific data for specific purposes. It is published through the main framework system, for example, merging data to add value to the existing database. This system is used for Online Analytical Processing (OLAP) for data mining.

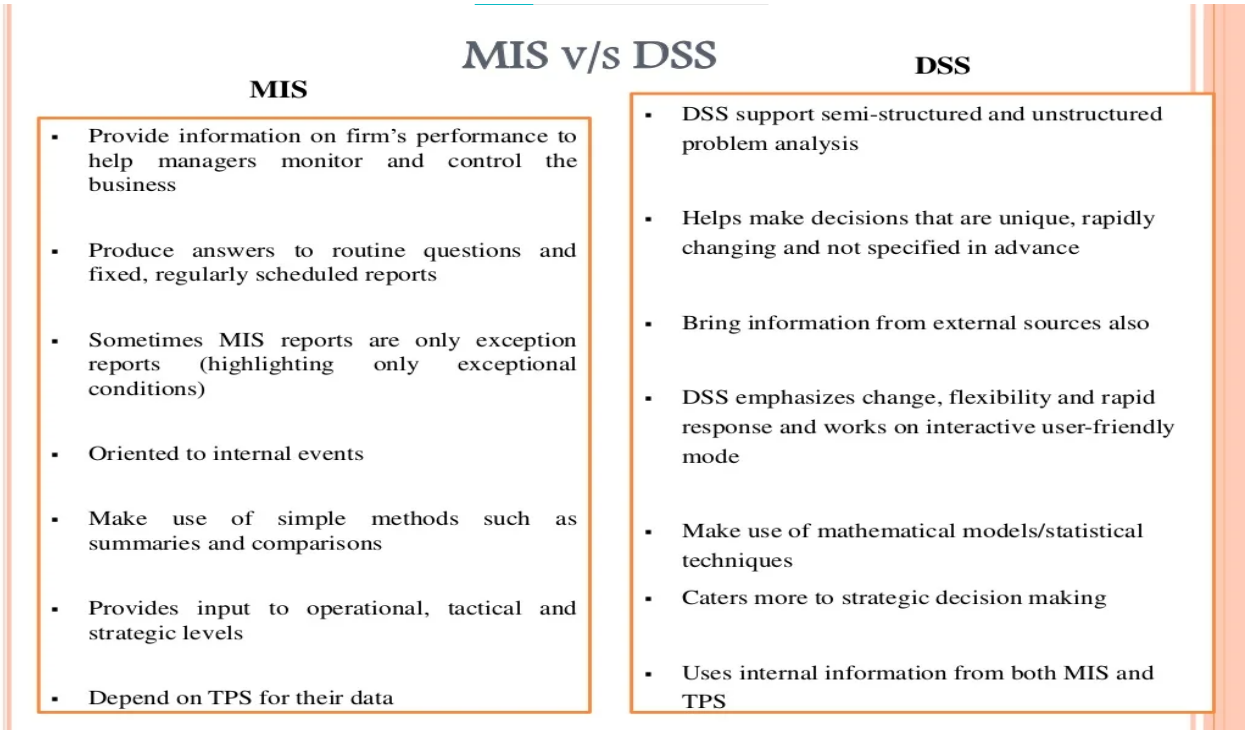
Analyze large amounts of data from different sources such as Own data, web data, or data from a data warehouse.



Management Information Systems: (MIS, 2022) (Tactical level)

It is a system used for decision-making, coordination, control, and data analysis that includes the study of people, technology and the relationships between them in an organizational context and helps companies achieve maximum benefit from investing in people, machines and business processes. It is a people-oriented field with a focus on service through technology. Data is collected and presented in the form Readable This system is used to generate comprehensive general reports of all the information to make decisions from the day-to-day detail to a higher level that depends heavily on technology.

Management Information Systems VS Decision Support Systems: -



Executive Information System (EIS): (EIS, 2022) (strategic level)

It is a decision support system used by executives in the decision-making process, because it provides easy access to important data that achieve strategic goals in the company and provides an easy-to-use graphical interface used to monitor the company's performance and identify problems.

5) What type of analytics and data mining tools were used in your analysis? Justify why you selected them?

Data analysis is part of successful business management because it leads to a better understanding of the company's performance, making better decisions to maintain its business and anticipating what will happen in the future.

Analytics tool: Microsoft Power BI

Type of analytics: (Data Analysis, 2022)

1- Descriptive analytics: It is the basis of all data insight. It is the simplest and most common use of data in business. It answers (what happened?) by summarizing past data in the form of a dashboard. One of its most popular uses is to track key performance indicators and describe how businesses perform based on specified criteria.
Applications: 1-KPI dashboards. 2- Monthly revenue reports. 3- Sales leads overview.

2- Predictive analytics: This type of analysis is used to make predictions about future outcomes that may be challenging. It answers the question (what could happen?) It depends on the data we have summarized and on statistical modeling and requires additional technology and personnel for forecasting. The accuracy of the forecast depends on the quality of the detailed data.
Applications: 1- Risk Assessment. 2- Sales Forecasting.

3- Prescriptive analytics: It is the vanguard of data analysis, which combines insight from all previous analyzes to determine the appropriate decision to solve the problem. This analysis uses the latest technologies and artificial intelligence is an example of descriptive analytics so that business processes can be implemented and improved without human intervention. He answers (what should I do?).
Most of the big data-driven companies (Apple, Facebook, Netflix, etc.)
Applications: Artificial Intelligence (AI).

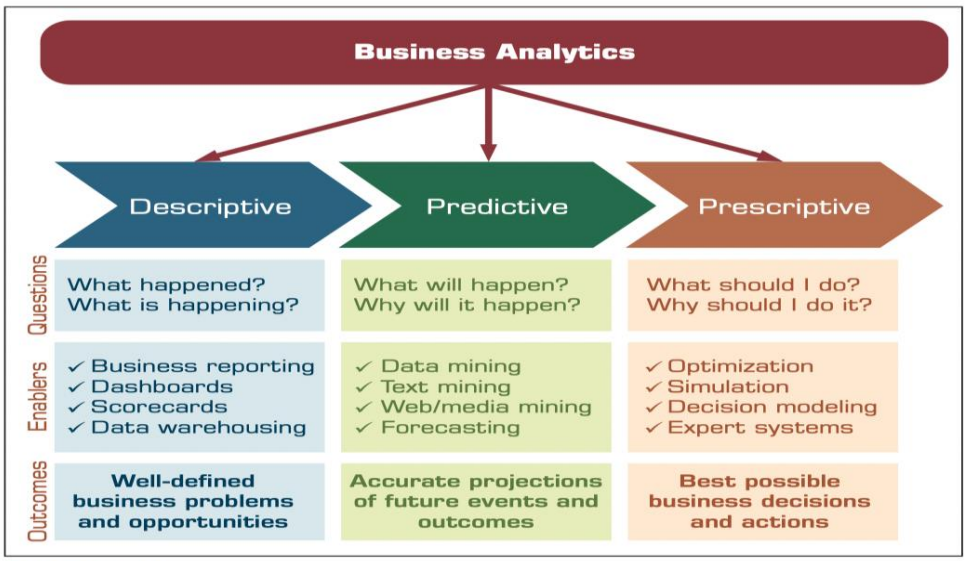
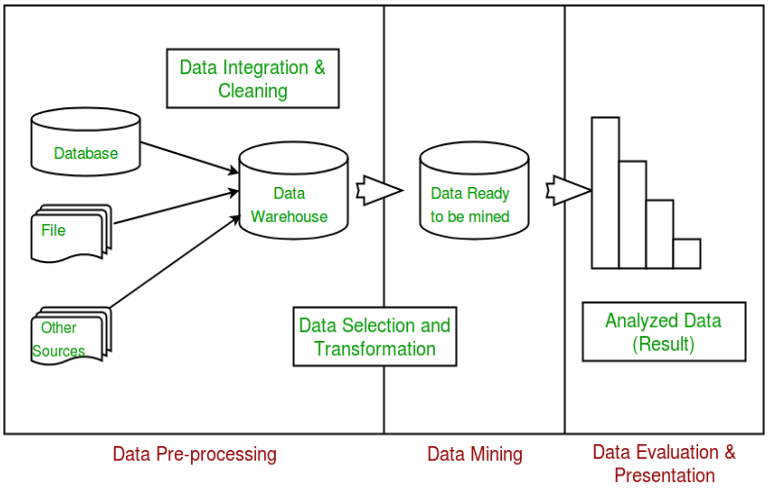


FIGURE 1.11 Three Types of Analytics.

Data mining: (Data mining, 2022)

It is the process of analyzing a large set of data that companies use to convert raw data into useful information using a program to search for patterns in big data that enables companies to deconstruct patterns and connections based on the information requested by customers to learn more about their customers, in order to develop marketing strategies and increase sales and depend on the effectiveness data collection, processing and storage by a computer. These operations are used to analyze large data and derive meaningful patterns.

Example: Product marketing, risk management, and fraud detection.



Data mining techniques include:

1- Association rules (descriptive): It is called market basket analysis, and it searches for relationships between variables, and this relationship creates additional value within the data set because it connects the parts of the data. An example of this is in the company's sales record to see what are the best-selling products so that it becomes easier for the company to plan, forecast and promote based on the results.
2- Classification (predictive): Uses specific classes to assign objects. These classes describe the characteristics of the items or what data have in common with each other. This technique allows basic data to be accurately categorized and summarized across similar features or product lines.
3- Clustering (descriptive): It is similar to classification but grouping identifies the similarities between objects and grouping elements based on their differences with other elements. An example of this may result from the classification of groups such as shampoo, conditioner, soap and toothpaste, so groups such as hair care and human health can be identified.
4- Decision trees: It is used to classify or predict a result based on criteria or decisions. It is used to request the entry of a set of questions so that the data is sorted based on the answers and is depicted as similar to a tree.
5- Predictive analysis: Used to take advantage of past data to build future graphical or predictive models Overlapping with regression analysis. This data mining technique aims to support the future based on the available data.
6- Regression: It is the process of data mining to identify and analyze the relationship between variables. It is a technique that determines the relationship between variables in the data set.

This relationship can be related to each other or causal relationship, and it clearly reveals how the variables are related. This technique is used for forecasting and data modeling. There are two types of regression, which are linear regression and multiple linear regression, which is a form of planning and modeling. An example of this is the forecasting of certain costs based on other factors. (regression, 2022)

Data mining tools: (DM tools, 2022)

1- Orange: It is an open-source information mining program based on the Python language. It is a great tool for experts in mining. There are many features. This tool supports machine learning algorithms for data modeling, aggregation, regression and manipulation, and provides a visual programming environment and high ability to drag and drop.
2- Statistical Analysis System (SAS): This tool is the best choice for tex mining, optimization, and data mining. It offers many techniques and methods to achieve analytical capabilities that assess the needs and goals of the company. It includes descriptive and predictive modeling and based on distributed memory processing architecture that makes it highly scalable.
3- Oracle: It is part of Advanced Analytics which provides data mining tool which are exceptional data prediction algorithms for classification, clustering, regression and correlation that allow retrieval of valuable and accurate data insights. This tool consists of PL/SQL, R and Java programming interfaces.
4- RapidMiner: It is a data mining tool with seamless integration with both R and Python APIs. This tool provides advanced analytics for creating new data mining operations and contains the best predictive analysis systems and some features include remote analysis processing, forecast validation, multiple data management methods, and data filtering and merging.

Key features of business intelligence functionality: (Features of Business Intelligence, 2022)

1- Data Visualizations: It is a graphical representation that contains information and data and provides a set of important tools that define a qualitative understanding of trying to explore a data set and extract some useful information so that it helps identify patterns, corrupt data, broken values, and so on. It is a technique that helps in the process of data mining and an initial step for pre-processing.
2- Executive Dashboards: The dashboard provides easy-to-understand data for business leaders, which helps in making decisions faster and better with less time and helps administrators to access key performance indicators, summary, organized and scheduling information. This technology is very important because it displays important data in a way that allows decisive decision-making and allows officials to remain constantly informed of their company's performance without having to refer to and audit big data. This method is called business monitoring.
3- Customizable dashboards and reports: Changing the way you view data is a great technique for getting quick data insights and helps with BI solutions that have a wide range of reports and dashboards that allow you to quickly see important and useful data trends. Insights help extract values that show key data from simple reports that provide detailed data analysis.
4- “What if” analysis: This analysis allows companies to assess the potential impacts that can affect critical business decisions using current data. This is done by developing strategies to achieve business goals and avoid default errors and hit, which makes management carry out accurate

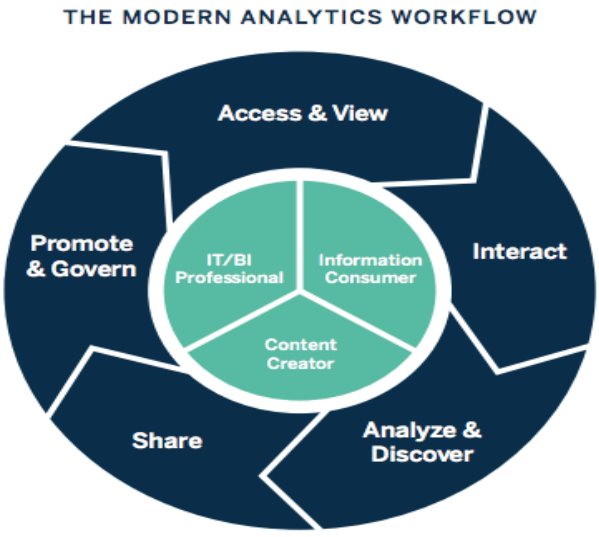
strategic planning and can benefit from artificial intelligence in this, because it determines Future implications This helps companies make informed decisions about their future plans. Predictive analytics also helps in understanding customer behavior and predicting the future.

5- Ranking reports: This technology allows the creation of reports for a specific category of data by defining certain criteria across multiple dimensions. These reports allow displaying the best and worst performing side of the work, for example identifying the top ten selling products in certain regions, but the main problem is that these reports are not accurate due to human errors and here they depend Companies automatically arrange data based on specific importance, making users identify the data that needs more attention quickly and easily.
6- Meta data layer: It makes reporting easy and eliminates the need for code and SQL, which makes users see and access data in a simple and easy to understand working language so that users interact with metadata without having to understand the complexities of the database so that the metadata layer supports a business intelligence tool more efficient and powerful than competitors because it helps to perform advanced analytics rather than individual data.

6) List any existing Jordanian businesses or companies which already used or may use the department of statistics data and explain how the data can help with their decision making or future investments? Make sure to provide references.

Business intelligence, which is one of the important things in business that has attracted the attention of business leaders, because this is done by analyzing data with high quality and structured so that it gives important details and useful and accurate data to help in the decision-making process so that future market trends are predicted. By imposing strategies, assumptions, and planning that help in the correct prediction of the markets and their basic and important needs, and increase sales based on products, which helps the company to set its goals, allowing business leaders to enter the markets with plans and strategies that increase the company's profits and make the company develop itself and prosper.

Business Intelligence: It is an infrastructure that contains a variety of tools and processes and combines business analytics, data visualization, and data mining to help companies make data-driven decisions with the goal of providing companies with complete and actionable data. (BI, 2022)

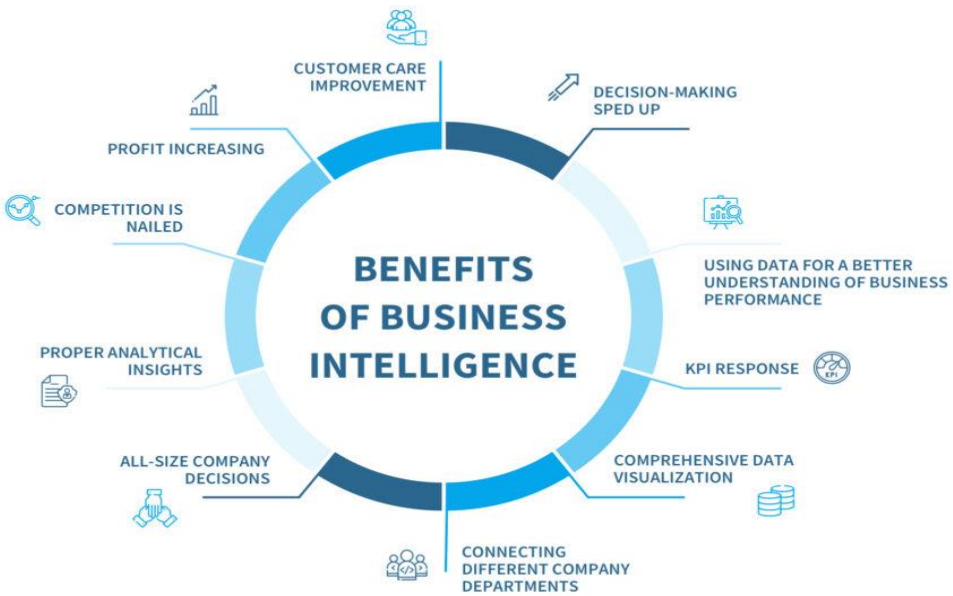


How business intelligence works: (How BI work?, 2022)

Companies always strive to achieve profits, and due to the advancement of technology, these companies will collect and analyze the data they have and determine their goals that they seek to reach. The data is processed and then stored in data repositories and the cloud so that users can access it and begin the analysis process to answer business questions, then data visualization tools, which present the data in the form of charts or graphs, and then present it to business leaders in order to make decisions and predict future patterns.

Benefits for organizations by applying BI: (benefits BI?, 2022)

1- Accelerate the decision-making process: When business leaders have concise data analytics, making decisions by adopting company performance strategies becomes easier and faster.
2- Data is used to better understand business performance: Modern business intelligence systems help enable companies to clearly understand what is happening, why it happened, and what needs to happen to improve their operations.
3- KPI response: Data is analyzed from multiple different perspectives so that companies can come up with actionable decisions based on different situations.
4- Comprehensive data visualization: Displaying data on user-friendly, interactive interfaces helps to get a better understanding of the insights presented.
5- Connecting the company's departments to each other: Different departments of the company receive data-driven improvement suggestions such as finance, sales, marketing and call center.
6- Corporate Decisions: Modern business intelligence solutions allow the dissemination of specific data or data analysis among many users.
7- Increase Profit: Increase profits for companies that use business intelligence insights.
8- Improve employee satisfaction: Business intelligence helps analyze data using ready-made business intelligence reports, as it spends less time responding to business users' requests.



Business intelligence techniques: (BI techniques?, 2022)

1- Online Analytical Processing (OLAP): It is an important business intelligence technique that allows users to analyze data from databases at the same time so that analysts can extract and display data from different points of view so that these programs perform resource-intensive data mining operations, making analysis faster Databases are divided into one or more cubes This is because the design of the cubes helps in writing and displaying reports easily. Example: for budgeting and financial forecasting. (OLAP, 2022)

2- Data Visualization: The data is stored in the form of numbers that are assembled as a matrix, but the interpretation of this matrix in making decisions is important to decipher the matrix. Data visualization is used, which helps in looking at the data on more than one dimension, helping them to make decisions, so when the data is presented in the form of graphs, it is understood more quickly.
3- Data Mining: It is the process of analyzing very large data to discover meaningful patterns in the data warehouse. The data stored is huge so finding the actual data that drives business decisions is important so mining is used to uncover hidden relationships in the data and then after that this data is processed and an appropriate way to display it.
4- Analytics: In business intelligence, data is studied to extract effective decisions, identify trends and patterns, and allow business leaders to understand the data in depth and extract the usefulness. For example, call centers make use of customer speech analysis to monitor customer sentiment and improve customer satisfaction and company satisfaction.
5- Reporting: In business intelligence, reporting is the comprehensive process of designing scheduling and creating performance that helps companies collect, process and present information effectively for planning and decision-making processes. Business leaders receive reports on a monthly basis according to their needs.

Business Intelligence tools: (BI Tools, 2022)

1- Oracle BI: It is a set of technologies and applications for business intelligence. This tool allows all the capabilities of business intelligence such as dashboards, proactive intelligence, customization and other things. It is great for big data analysis and its features are versioning, self-service portal, notifications and data archiving.
2- Tableau: It is a business intelligence tool that specializes in data discovery and visualization so that it becomes easy to analyze and visualize data without the need for an information technology department. There are special servers for companies and there is also an online tool that you can use.
3- Microsoft Power BI: It is a data analytics platform that has a suite of business analysis tools and excels in data visualization that allows users to identify real time and allows users to integrate their reports and dashboards in real time.
4- Datapine: It is an easy-to-use business intelligence platform for data analytics for non-technical users because a comprehensive, self-service approach to data analytics allows for data integration, advanced data analytics, build interactive business dashboards, and actionable insights.

The companies used or may use the department of statistics data: - (company DOS, 2022)

1- Arab League: It is a regional organization headquartered in Cairo. It consists of 22 members. The main objective of it is to strengthen relations between countries, cooperation and consideration of the affairs of Arab countries. The Arab League benefited from the General Department of Statistics to know the number of people whose ages exceeded between 18 and 24 years, to know how many people from It is possible to belong to this university based on the percentages of each Arab country.
2- United States Agency for International Development (USAID): It is the first development agency in the world. This agency works on international development, strengthening national security, economic prosperity, ways of self-reliance, and providing humanitarian assistance. This agency helped Jordan advance and improve education and health. The agency made use of the General Statistics Department to know the unemployment rates in Jordan and the gross domestic product, because this agency seeks to reduce unemployment around the world and reduce barriers for young men and women. (USAID, 2022)
3- The Ministry of Higher Education and Scientific Research: It is a governmental institution specializing in higher studies, starting from the university degree to the highest acquired degrees. This ministry takes advantage of the General Statistics Department as it seeks to reduce unemployment rates by directing young people to new specializations and having job opportunities so that it seeks to reduce unemployment rates, and this helps to improve the economy and development.
4- The Ministry of Tourism and Antiquities: It is a governmental institution that seeks to improve tourism in Jordan and has benefited greatly from the Department of Statistics, as it has established what are the most touristic places in Jordan and what are the areas that need to stimulate tourism to them, the number of people who visit these places and how to make these tourist places be With high readiness and increasing the absorptive capacity of visitors and attracting them towards visiting tourist places.

Business Intelligence Strategies Prominent Companies Use: (BI companies, 2022)

1- American Express: Technology is used to develop payment service products and market offerings to customers and has benefited from business intelligence in the finance industry by identifying users who will close their account within four months and by using business intelligence helped the company to predict what will happen in the future in order to protect their customers.
2- Chipotle Mexican Grill: It is a chain of restaurants, and by using business intelligence, it has been able to monitor the operating efficiency of each restaurant and present this data on dashboards. It has also been able to create unified key performance indicators to measure performance, which saves thousands of hours on the company.
3- Coca-Cola: It is a company that sells famous soft drinks using business intelligence. It obtains data through their social media through pictures so that the company can know when the picture was published for its drinks so that the company prevents knowing about the people who drink their drinks and what countries buy their products the most. This information helps the company to provide targeted advertisements.

7) Are there any security or ethical issues with the collection and distribution of the data by the department of statistics? Discuss how you can improve data collection and data distribution by the department?

The Department of Statistics deals with huge amounts of data every day to predict future trends using business intelligence. Thus, due to the advancement of technology, the Department of Statistics seeks to take security measures and this happens due to the continuous movement of data, so the data must be protected, because the data is transmitted from one source to another during processing and every time This data is transmitted to be at risk, so the Department of Statistics must be careful to protect the data from breaches, violations and malicious programs that seek to destroy and destroy this data or perform other operations such as changing the data. Develop security strategies to protect from attacks, so companies must preserve all data, not only protect their interests, but also protect customer data. Therefore, companies have adopted two-step authentication to verify customers and are more effective than username and password. The Department of Statistics must determine who can access data based on several specific factors. This feature provides additional protection for data and helps secure customer accounts and data. (security BI, 2022)

Business intelligence opportunities have many forms, which attract companies in all fields, since the amount of data is large and it is difficult to process and obtain manual insights. Therefore, business intelligence is based on automating data analysis quickly to produce reports and visuals that lead to decisions that help improve sales, reduce costs and increase production, making it easier for non-technical users to create accurate and fast reports in real time. Processing and analyzing big data using business intelligence tools creates security risks, so understanding and managing security vulnerabilities is part of data preservation.(BI Security Risk, 2022)

Data protection is one of the important things for organizations, because when a data breach occurs, it causes a decrease in the market value and a lack of customer confidence in the company. Therefore, organizations seek to provide the necessary protection for the data, but there is no guarantee of 100% data protection. This means that there is no secure institution, so companies Finding ways to ensure safety.

Implications for data security management: (security management, 2022)

1- Identifying vulnerabilities: When data flows, it is vulnerable as it can be hacked and use this loophole in the system so that hackers can use the data in the company and store it to an external database, which causes problems for the company, and hackers can modify and delete the data, so companies must take action Continuous checks to discover security vulnerabilities that could cause problems and damage to the company.
2- Encrypt communication: When data is transmitted between employees of the organization, it can cause a data breach. Business intelligence tools are prime targets for hackers, because there is control over the data, so you need to encrypt the data always to prevent any unauthorized person from accessing the data, and thus the data becomes More protection.
3- Assigning Permissions: Access to data must be restricted so that you set specific permissions for each employee in the organization so that he performs his basic tasks without interfering in other matters, and in this way, the protection of information will be increased by placing restrictions on it. Examples of access restrictions are the use of facial recognition technology to grant permissions, and there are other things such as the retina and fingerprint.

4- Set a strong password: The main problem in data protection lies in passwords so that customers put easy passwords such as numbers from 1 to 8 or put their name or date of birth and here it becomes easy for hackers to know the password, so institutions must send a message that Change the password from time to time and set laws such as entering symbols, letters and numbers in order to prevent intrusions.
5- Storing data in the cloud: Business intelligence and the cloud are complementary technologies so that the cloud company is responsible for protecting data and the companies with the best secure cloud are Google, Amazon and IBM, they have infrastructure and resources to ensure security.

How Does Cyber Security Support Business Intelligence? (cyber security BI, 2022)

Cybercrime causes problems for companies and huge financial losses and causes a loss of customer satisfaction. In view of the spread of electronic attacks, companies have become interested in the issue of protection, and thus companies have become interested in this because it threatens their reconciliation, because cybersecurity prevents any serious problems, prevents electronic crimes and puts risk sensors, and cybersecurity is considered Part of business intelligence, because the data collected and stored by business intelligence systems is secure so that it becomes more effective and better processing and protection of data that enjoys Internet of Things technologies. Thus, we discover that companies that care about data protection matters are large and huge companies such as Google and Microsoft are successful companies because of security.

Data management and dissemination make mining and visualization analytics as simple as possible, and by using business intelligence tools, companies can connect reports, dashboards, and visualizations to basic operations. These tools help keep data clean and secure, so cybersecurity and data governance are things that need focus and continuous effort It is better to protect data early before being exposed to electronic attacks, which causes business interruption and financial losses, and there are penalties and fines for data breaches.

Legal issues:

1- The issue of copyright and authorship, and in view of the Department of Statistics, it has the authority to publish data, books and reports and display data and pedigrees on its own website.
2- Privacy and security: the organization's information must be protected and there should be no modification from third parties who want to destroy the data and maintain the confidentiality of the data collected from companies for statistical operations.

Discuss how you can improve data collection and data distribution by the department? (How to improve data collection, 2022)

There are many ways to improve data collection because there are many programs that help in collecting data, but there are things that must be adhered to improve the data collection process.

1- Think about customer interactions: One of the important things you need in the process of collecting customer data is the first step. For example, in the Department of Statistics, the process of collecting data should be at different ages and specify the nature of the data you want to collect, and this helps in obtaining the most important information.

2- Think about data related to behavior: You must obtain the opinions of customers so that the organization determines what data the customer does not want to disclose to avoid so that the data collection becomes in a high way without storing unimportant data.
3- Think about the metrics that you use: The method in which data is collected depends on how it is planned to be measured, which is used to determine the success or failure of data collection in order to collect data related to the organization that needs it. Measurements because it helps not to make wrong decisions.
4- Think about the people who will see the reports: During the implementation of the data analysis process, and then after the analysis, you will create the reports, but you must think about who will read these reports and what is the most important information that the organization needs, because the way to write reports varies based on the audience who will see this data to obtain the best results.

As for the process of data distribution, you need to organize and display information such as statistics charts and graphs in order to simplify the data to the public, so the General Department of Statistics collects data and then displays it on its own website in different forms such as bar charts, pie charts, etc.

D1 Evaluate the benefits and drawbacks of using application software as a mechanism for business processing

Application software: It is a type of computer program that leads to a specific function, which helps customers in completing tasks and is linked to productivity and creativity.

Benefits: (Business Software, 2022)

1- Increase and measure business productivity
2- Improving employee efficiency and business effectiveness
3- Reducing costs and reducing human errors
4- Communicate more effectively with customers
5- Simplify business processes
6- More reliable data due to less risk of using inaccurate data
7- Increase sales and track business progress
8- Improve data security and reduce risks

Drawbacks:

1- Do not allow a repetition of business
2- Application development is very expensive and it is difficult to carry out industrial operations and needs more time
3- It takes a lot of money to build it
4- If the application is hacked, it will put all data at risk

Example: Spreadsheets, Database, Graphics, Word processing.

D4 Evaluate how organizations could use business intelligence to extend their target audience and make them more competitive within the market, taking security legislation into consideration.

For companies that seek to increase their sales and production and seek to increase competition in the market, this matter depends on business intelligence and the ability to use advanced analyzes with high accuracy and accordingly, you need business intelligence tools to conduct analyzes to help the organization grow and allow competition for a long time and help the prosperity of the organization and make it Able to predict and actionable insights.(2022)

To improve the organization and make it competitive within the markets, you need to improve marketing, because marketing is no longer based on guesswork, but marketers need to improve their movements using business intelligence because ideas are based on data and make decisions in order to increase profits and make the organization rely on facts to accomplish tasks and prepare Business intelligence tools are rewarding because they analyze data from all sides and help make highly targeted marketing decisions. Marketing mistakes become easier to avoid when data is converted into a dashboard and presented to administrators so that they make better and more informed decisions, help understand customer needs, reduce costs, identify market trends, and increase Sales and revenue.

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