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**ALY 6060 – Decision Support and Business Intelligence**

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**Introduction**

Every second, more data is believed to be traveling across the Internet than was stored in the entire Internet 20 years ago (Brynjolfsson & McAfee, 2012). The technological, sociological, and cultural transition of our society into the era of big data and analytics has brought with it a new set of challenges and potential for competitive advantage. The process of developing and evaluating alternatives to make a decision is a choice among the available options. The majority of decisions are taken in response to a dilemma, a gap between a desired and actual decision and require judgment. There are two types of decisions: programmed and non-programmed. Leaders in a range of industries are recognizing the value and benefits of big data analytics in tackling problems and uncovering innovative solutions. In the field of information technology, business intelligence is a relatively recent concept. The definition of business intelligence varies depending on the situation. It describes the transformation of data into information, which is then transformed into knowledge. As it progresses through each stage, the intelligence is said to become more useful to the consumer. BI is a compilation of principles and techniques for using fact-based support structures to enhance business decision-making. Ad hoc query, report writing, decision support systems, executive information systems (Key Performance Indicators), and statistical analysis and online analytical processing are examples of BI tools (OLAP).

**Data Decisioning Importance**

The use of facts, measurements, and data to influence strategic business decisions that correspond with your goals, objectives, and projects is known as data-driven decision-making (DDDM). Many businesses are creating three essential characteristics to become data-driven: data competence, analytics agility, and community. It's not easy to change the way your firm makes decisions, but putting data and analytics into decision-making cycles is where you'll see the most significant changes.

**Strategic Planning Activities & BI in a Commercial Operation**

Data boosts productivity. You'll be able to direct precious resources where they're most needed if you collect and analyze data effectively. If there is a considerable increase in important occurrences in a specific service area, the data can be analyzed further to see if the increase is widespread. IT professionals were the primary users of BI apps in the past. BI tools, on the other hand, have become more intuitive and user-friendly, allowing a wide number of users from various organizational domains to use them. Self-service business intelligence, a type of BI technology intended at abstracting away the requirement for IT intervention in generating reports, arose from the desire to make it feasible for almost anyone to extract relevant information out of business intelligence tools. Self-service BI platforms allow companies to make internal data reports more easily accessible to management. Qualitative measures could include the amount of data access requests made by end-users, enhanced productivity, or the frequency with which deadlines are met. You should also assess the BI governance group's efficacy, such as whether all objectives were met or not.

**BI Common Tools**

Business intelligence (BI) software is used to extract information from structured data. Companies can utilize the tools to track a variety of user-defined KPIs. Data-driven decision-making processes are aided by business intelligence tools. Some of the tools which are most popular and used in the BI domain are Google Data Studio, Tableau Public, IBM Watson Analytics, Zoho Reports, Microsoft Power BI, QlikView, Knowage, Pentaho, RapidMiner, KNIME Analytics Platform, Datapine, Microstrategy, Looker. Meeting the requirements of customers is what propels businesses forward, which is why it's critical to be able to spot patterns in customer behavior. It's difficult to know what clients want without spending hours upon hours reading over previous reports without BI tools. It enables us to determine which consumers should be given top priority to boost customer satisfaction. Managers can use BI tools to compile data from a variety of sources related to the company's commercial activities, such as different types of software, data from online stores, tables, reports, and logs, and so on. Sales data, the number of things in stock, projects, individuals, workloads, and so on are examples. According to Alpha Serve (n.d., p. 2), "the basic goal of BI tools is to turn large amounts of data into easy visual reports that help people comprehend their current position and make informed decisions."

**Everything about Models, UI, Culture, and Design**

Model-Based User Interface Development (MBUID) is one method for dealing with the aforementioned issues and reducing the time and effort required to design UIs while maintaining UI quality. The goal is to find high-level models that allow designers to specify and analyze interactive software systems from a more semantic perspective rather than jumping right into implementation. This helps them to focus on more essential issues without being distracted by numerous implementation details, and they can subsequently utilize tools to update the implementation to ensure that it is consistent with high-level choices. BI systems use a variety of expert systems, OLAP, and data mining technologies to achieve these goals. On the Internet, knowledge discovery is frequently hampered by information overload. Existing tools cannot analyze and visualize data. Users are frequently bombarded with irrelevant content on search engine results pages. This study presents a visual paradigm for web-based knowledge discovery. To facilitate effective exploration, the system incorporates Web mining, clustering, and visualization tools.

**Data Scientist/ Data Analyst Role in Decision-making**

According to AltexSoft (n.d., p. 6), “Data analysts support decision-makers by detecting intriguing and essential patterns in data and offering quick answers buried in mountains of tables, graphs, and log files. In a nutshell, data analysts indicate areas where statisticians and machine learning engineers may be required if domain experts deem these areas to be critical.". The decentralized model is suitable for organizations that do not want to expand into a data-driven organization. It can also be used in the early stages of data science activities for the short-term progress of advanced analytics demo projects. The most significant difference between these two professions is one of time horizon. By examining trends and patterns, they hope to glean insights from the data in front of them. Their main goal will be to write reports based on the information gleaned from trend analysis. In their day-to-day work, a Data Scientist, on the other hand, is always looking forward. They'll probably have similar abilities to a Data Analyst, but they'll also have to develop new data modeling techniques, design predictive models, deal with algorithms, and dabble in machine learning. Their goal is to forecast the future using data patterns from the past.

**Data assets to Drive Decision-making**

When you use facts from the past to forecast what will happen in the future, the process gets more sophisticated. Big data, data analytics, business intelligence, diagnostic analytics, data analysis, data modeling, and online analytical processing are all terms used to describe this technique. Data-driven decision-making promotes transparency and accountability, as well as improved teamwork and employee engagement. DDDM policies make it evident that the organization is not driven by whims or fads, and morale rises when people understand that management decisions are based on objective data. Developing a data-driven culture necessitates a long-term commitment to educating all personnel of a company and top-down support. Even still, anticipate it will take time for this new style of doing business to emerge. Today, just over half of businesses feel that information is highly valued for decision-making or regarded as an asset in their firm. However, two-thirds believe it will happen in the future.

**4th Industrial Revolution Importance in Data Analytics & BI**

It is quoted in Decision Inc (n.d., p. 1), “that the ability to use and analyze data will be one of the most important business drivers in the future. This allows for a deeper grasp of one's company's and customers' needs”. The change to a more mobile-centric landscape, in which consumers expect to have access to real-time data for informed decision-making, is a component of this journey. The Fourth Industrial Revolution combines data, analytics, and real-time presentation to help customers make better decisions and streamline their processes. This is a huge paradigm shift. The fact that we are now pulling together vast amounts of data, applying deep analytics, Big Data analytics, and machine learning to fuse the data, make conclusions, and then deliver that knowledge very fast to drive changes in how we manufacture, plan resources, and so on, is the key enabling for 4IR.

**AI in Decision-making**

Predictive analytic skills, which can be incorporated through the use of models on the edge layer, as stated above, expert systems, basic algorithms, or supporting machine learning, are one of the main aspects in every Industry 4.0 development. We may need a simple temporal projection, a trend analysis, or, in more extreme circumstances, the deployment of neural networks or deep learning algorithms, depending on the project requirements. This is when the expertise of various platforms and project management experience comes into play. The spread of new technologies or processes toward the development of creative business models is a critical component of the successful route to Industry 4.0. The constant changes in the world, the movement from physical to digital, and new ways of conducting business contribute to the development of businesses through the creation and implementation of business models that demand constant innovation.

In Tenfold (n.d., p. 1.), “Machine intelligence, or a machine's ability to mimic human cognitive abilities, is referred to as AI. It is capable of learning and problem-solving. These machines are known as "intelligent agents" or bots in computer science”. Consider a common decision you might have to make, such as determining which new things to introduce and which shop locations these things will perform best in. You might need to start by deciphering sophisticated spreadsheets and reports, and you could even need to seek advice from your category managers, vendors, and store managers. To run some reports, you may need to collaborate with a data analyst. What if this system could instantly filter through millions of data points and provide you with the correct answers you require? What if you had a smart AI-based analytics system, similar to Alexa or Siri, that you could ask questions of using your smartphone, tablet, or computer? These conclusions would be drawn from data gathered from a variety of non-integrated software systems, including POS, eCommerce, CRM, inventory, and more.

**Avoid Bias in Business Decisioning**

Bias is a difficult thing to avoid or eliminate. We can, however, keep it in check – and use it to our benefit to make better decisions. Here are three ways you might employ to try to be mindful and open while avoiding at least some bias. Decision quality is excellent in data-driven firms that can apply objective measurements. When the data is qualitative or subjective, however, the tendency is to choose the better story (or the more appealing storyteller), rather than the better evidence. Bias is unavoidable. Hypothesis testing is also used by businesses when vetting investments or raising capital for a startup, for example. We forecast revenues based on market trends and previous company performance, forecast expenses based on what we can learn about supply, production, and distribution costs, and assess whether we should pursue it based on measures like return on investment. Managers frequently make the mistake of emphasizing readily available low-importance issues over feebly graspable yet high-importance aspects when prioritizing one option over the others. Every new option should be realistic and address the complete spectrum of the problem. To overcome your cognitive biases as a group and change your decision-making process, you must first acknowledge that they exist.

**Conclusion**

Companies must remain focused on analytics because data is such a crucial component of running a business. At all levels of the organization, leaders should make decisions that reflect the company's strategy. Colleagues are unable to see past the silos and tackle the problem due to a lack of clarity. You'll need to put in a little more effort than merely deciding to utilize data to guide your business decisions one morning to become a data-driven corporation. It's not only about picking the best analytical tools to help with data extraction, however, having the correct IT infrastructure in place is essential. The fact that BI systems are significantly less expensive and time-consuming to create and implement than other DSS approaches is a big advantage.

BI tools are a subset of the larger decision support system definition, providing a variety of insights, tools, and data literacy benefits to businesses trying to improve their data literacy, particularly in the age of big data, AI, and machine learning. Data-driven decision-making is a crucial ability for any professional, but it's especially crucial for those who work in data-driven positions. Learning the ropes is critical for new data analysts who wish to play a bigger part in their company's decision-making process. Analysts who want to be more involved in their company's decision-making process should know what data-driven entails.

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