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Report

Introduction:

In this report, I aim to explore the significance of Business Intelligence (BI) and its contribution to effective and timely decision making.

In order to do this I will be using the example of a logistics company – Red Stag Fulfilment (RFS) - and how business intelligence is vital to the efficient and successful running of this organisation. It is important that this company utilises business intelligence as it provides the company with trends, patterns and knowledge, allowing it to make decisions such as when it is suitable to courier products, how this can be done in the most efficient way possible and how it can improve its services to maximise revenue and thus profit.

This report will look at the application business intelligence has in RSF by exploring trends in business intelligence, data mining (DM) and data warehouses (DW), looking at both DW and DM in detail, predictive analysis tools, dashboards and ethical concerns.

Trends in BI, DW and DM

Business intelligence is defined by Chen et al as "the technologies, applications, and practices for the collection, integration, analysis, and presentation of business data."¹ This means business intelligence is concerned with the application of data. For RSF, this data can come from shipment to location. BI would be concerned with using this data to predict customer trends and make decisions that the data seems to be suggesting as beneficial. It is a critical thinking process to best apply objective data to subjective actions - ones that are the most efficient for the business.

The process of BI includes both Data warehousing and Data mining. Data warehousing, according to Dey (2003), is "the process of integrating operational data into a single repository, which is becoming in modern organizations."² This allows the data to be stored in a singular place, allowing for easy access and analysis. For RSF, shipment data would be held

¹ Chen, H., Chiang, R.H.L. and Storey, V.C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 36(4), pp.1165–1188.
doi:<https://doi.org/10.2307/41703503>.

² Dey, D. (2003). Record Matching in Data Warehouses: A Decision Model for Data Consolidation. *Operations Research*, [online] 51(2), pp.240–254.
doi:<https://doi.org/10.2307/4132403>.

in data warehouses so that computers have a restricted domain to search for relevant data, allowing for the efficient collection of relevant data. Kimball's Data warehousing proves as a suitable model by “creating data marts of specific sections (e.g. HR, Couriers) and interlinks them through its bottom-up approach”³

Data mining on the other hand is, according to the Cambridge Dictionary, “the process of using special software to look at large amounts of computer data in order to find out useful information”⁴ This would include computer software that can single out relevant data and search for it in a timely manner in the data warehouses it is being store. The CRISP-DM model is a flexible methodology for data mining, allowing specific focus on business objectives and aims, showing it is flexible across multiple industries including logistics.⁵

Business intelligence includes the operation of both DW and DM where data can be stored in a particular domain through Data Warehousing and found within this domain through Data Mining. This is very useful as it allows for data to be found easily and used properly. For a logistics company like RSF, this can make data storage and analysis easier by grouping data in warehouses so that perhaps data of regions can be found easily after it has been warehoused through data mining. This allows for courier exchanges in different regions to run efficiently by separating and finding this data in different parts of the world to ensure international shipping.

Data Warehousing in Red Stag Fulfilment (RSF)

It is vital for RSF to use Data Warehousing as it requires a lot of data handling due to its different services. RSF are used mainly for their courier service in shipping and delivering packages. It can use data warehousing to separate regions and use this data accordingly, as well as separating different items in their holding warehouses.

Data Warehousing proves useful as it consolidates information and data into a single repository. For RSF, this can include information storage on different suppliers such as Amazon, so that they can organise as well as analyse e-commerce coming from different

³Kimball Group. (n.d.). *Kimball Technical DW/BI System Architecture*. [online] Available at: <https://www.kimballgroup.com/data-warehouse-business-intelligence-resources/kimball-techniques/technical-dw-bi-system-architecture/>.

⁴ Cambridge Dictionary (2025). *data mining*. [online] @CambridgeWords. Available at: <https://dictionary.cambridge.org/dictionary/english/data-mining>.

⁵ Smart Vision Europe (2017). What is the CRISP-DM methodology? [online] Smart Vision - Europe. Available at: <https://www.sv-europe.com/crisp-dm-methodology/>.

organisations. This is useful as it enhances decision-making by holding data in one place so that it can be searched easier. This can reduce business costs by making data mining easier and producing effective actions based on the data being held. This can therefore improve data access and efficiency.

Furthermore, DW can support strategic decision making by cataloguing data into a singular warehouse. This allows the data to be searched among relevant information, held by the warehouse. For example, long term growth can be enabled by allowing analysis of relevant information. Chen et al imply that effective data warehousing is “crucial for the collection, integration, and analysis of data, which are essential components for making informed business decisions”⁶. This is essential to business intelligence and thus helps with the strategic decision making needed for businesses to flourish.

An example from RSF could be the usefulness of data warehousing in establishing long term growth. With Data warehousing RSF can calculate costs per client to show which suppliers are most profitable and how they should approach them. By categorising clients based on costs in a data warehouse, the business can efficiently calculate information like this to show how it can move forward, creating long term sustainability for the business.

Data Mining Techniques

Data mining, as explained before, refers to searching for data and analysing it by breaking it down.

One technique of data mining is regression. Regression modelling, as described by Bertsimas et al (2007), “is a statistical method used to predict a continuous outcome variable based on one or more predictor variables”⁷ This is useful in business intelligence as it provides an objective methodology on how to data mine. By using relationship patterns, it is able to predict future relationships. For example, showing a linear regression shows that one variable may increase or decrease when another variable increases or decreases showing the variable may be dependent. For RSF, it may be more suitable to use a multiple linear regression as there are many factors it must take into account, considering it is a logistics firm.

Red Stag Fulfilment may be able to use regression to guide decision making. For example, comparing volume of orders and factors affecting staff absences. This can help to produce a

⁶ Chen, H., Chiang, R.H.L. and Storey, V.C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly*, 36(4), pp.1165–1188.
doi:<https://doi.org/10.2307/41703503>.

⁷ Bertsimas, D. and Shioda, R. (2007). Classification and Regression via Integer Optimization. *Operations Research*, [online] 55(2), pp.252–271.
doi:<https://doi.org/10.2307/25147075>.

result which dictates how a company should expect to receive labour based on perhaps the season, time and more. If there are more orders at a certain time of year, the company can seek to employ more individuals to ensure the business can keep up with deliveries. This shows how regression can be used to predict labour trends, ultimately providing businesses with knowledge on how to approach labour supply. They can use spreadsheets such as Excel to find similar data points and plot them in a graph to determine a relationship between variables.

Another technique for data mining is clustering. This may be more effective as it sorts categories of data into subsets that are directly related to each other by falling under the same category. It is defined as “Clustering is an unsupervised machine learning algorithm that organizes and classifies different objects, data points, or observations into groups or clusters based on similarities or patterns.”⁸ Keele University says Clustering can “recognise patterns, summarise data and detect outliers”⁹. This means unlabelled data can be categorised into groups allowing for clearer analysis. This can be obtained by using tools such as Power BI.

For RSF, clustering can be used to cluster data into geographical areas, delivery date or common combinations. This can lead to effective analysis by showing similarities and differences in data, allowing them to be used in context.

Both methods can help RSF by showing relationships between variables so that the business can determine when delivery is optimum and how much staff it should hire, as well as labelling data which allows RSF to analyse similarities with what works best and differences to clarify what is distinct.

Predictive Analysis

In a logistics environment, to predict future trends like costs, delivery times, or warehouse staffing, tools are crucial. For this, I recommend looking at Microsoft Power BI, RapidMiner, and standard Excel.

Power BI is user friendly and fits into what most companies already use. If the business runs on Microsoft, Power BI plugs directly into current databases, warehouse software, and transport systems. Its reporting automation can build a dashboard once and updates

8 IBM (2024). Clustering. [online] Ibm.com. Available at: <https://www.ibm.com/think/topics/clustering>. I

9 Keele University - Study online. (2023). Keele University - Study online. [online] Available at: <https://online.keele.ac.uk/blogs/clustering-and-cluster-analysis-an-explainer/> [Accessed 28 Jun. 2026].

automatically as new shipping data is obtained. It also has simple forecasting tools built in, so RSF can easily spot future trends without needing a programming background.

For predictions, like predicting exactly how a sudden spike in fuel prices will impact specific shipping lanes, RapidMiner is the better option. It handles messy data and complex predictions much better than Power BI. It takes more time to learn, but it connects easily to other company systems and can run heavy logistics math in the background.

Finally, Excel is still a great baseline for quick calculations. It can help create data mining techniques by providing a foundation for data. However, it needs to be operated manually so may not be entirely suitable to RSF large warehousing.

Ethical and Data Security Considerations

Data ethics is about processing personal information lawfully and transparently. For a logistics company, this means following rules like the UK GDPR when handling customer delivery addresses or employee records. Transparency and respecting data ownership. A business needs to get clear consent from people and only keep the minimum amount of data required, rather than keeping the extra information.

To protect this information, companies must put solid technical safeguards in place. This means using strong encryption and strict access controls. A key concept here is "least privilege,"¹⁰ which restricts system access based on someone's specific role. For example, a warehouse worker only needs data about the pallets they are moving, so their account shouldn't have the permissions to open the company's financial databases.

Finally, a good security plan must look at both external and internal threats. External risks, like hackers, are handled by strong network firewalls. But internal threats are also dangerous such as an employee accidentally leaking information.

Reporting and Dashboard solutions

Reporting tools and dashboards, like Microsoft Power BI or Tableau, are essentially the visual screens used to track a company's real-time performance. This means dashboarding is concerned with making every day operational data easy to see briefly. For RSF, this data can come from live delivery routes or current warehouse inventory levels. Dashboards would be concerned with using this data to monitor the supply chain as it happens, helping managers make quick decisions that the live numbers suggest are necessary. It is a critical process to best apply raw, objective data to subjective management actions. This keeps the business running as efficiently as possible.

¹⁰ www.copado.com. (n.d.). What are the Benefits of Principle of Least Privilege (POLP) for My Organization? [online] Available at: <https://www.copado.com/resources/blog/what-are-the-benefits-of-principle-of-least-privilege-polp-for-my-organization>.

The system must track specific Key Performance Indicators (KPIs). For RSF, this would include delivery rates to make sure clients get their shipments, Warehouse Capacity to prevent the storage from getting overcrowded, and cost per mile to watch daily transport expenses. By laying these KPIs, a dashboard lets leaders spot problems instantly instead of waiting for a monthly spreadsheet, making decisions that the data proves will be beneficial.

Conclusion:

To conclude, Business intelligence is essential in decision making because it provides companies with the knowledge and data required for effective and efficient decision making. Data warehousing and mining allows for data to be categorised and analysed, providing businesses with knowledge to create strategic decisions that are beneficial to the business.

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