



Case study

Business intelligence in magazine distribution



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ABSTRACT

This case discusses the use of business intelligence systems in the running and optimisation of magazine distribution by a UK company. The company collects a wide range of data to help it monitor and optimise a supply chain involving subcontractors. The case study raises a number of issues which are discussed. It illustrates the variety of forces which are driving companies to adopt business intelligence systems. It demonstrates how business intelligence systems can help run business processes. It explores the problems and issues with sourcing, collecting and cleaning data. Issues around anonymisation and the concept of a 'single version of the truth' are discussed and ethical issues highlighted. It concludes that an understanding of the role of interpretation in data collection, collation and subsequent decision making is critical to business intelligence and calls for more research in this area.

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1. Introduction

Business Intelligence (BI) and analytics concerns the organisation and processing of large databases in order to support decision making in the organisation. Sources of data can be both internal and external. Data can be accessed and processed in a distributed fashion, or gathered into an internal database. BI usually involves statistical software and analysis of trends. The purpose of BI has tended to concern market analysis and decisions on competition, customers and product placement. However, BI can also be used to study and improve business processes. This case study follows an example of such a use of BI.

BI has often been seen as the domain of large companies, accessing large distributed databases and massive sources of customer data, so-called big-data. Some organisations set up departments for BI, centred on a business intelligence competency centre (Laursen & Thorland, 2010). However, BI can be used by smaller companies to help understand the processes which they manage. In the case study described here, the small company manages a group of suppliers and service providers to ensure the smooth and timely delivery of magazines to newsagent chains and supermarkets.

While BI is not a new idea and has been considered since the beginnings of business computing (Luhn, 1958), it has only recently become a major commercial concern for many companies. A number of factors have contributed to its rise in importance. There is a greater availability of data sources than has been the case in the

past. The rapid expansion of large databases offers new opportunities to companies. Improved BI tools which do not require IT expertise are available. This encourages employees at all levels to explore the potential of business intelligence. Additionally, competitive and economic pressures require more efficiency in processes. BI offers a way of analysing operations and identifying improvement. Finally, through media and trade journals, the profile of BI has increased dramatically in the last few years (Chen, Chaing, & Storey, 2012).

BI involves three major steps, extraction, transformation and load (ETL). These steps are not necessarily linear and depend on the development of a data design. The metadata model influences what data is extracted, but also is influenced by what data is available, and the nature of the questions being asked by employees and the processes being analysed. Extraction is inevitably a process of selection: selection of sources and data within sources. Data transformation involves resolving inconsistencies, validating data ranges, removing irrelevant data and checking for accuracy. Loading concerns populating the target BI database with the structured information. Each step involves interpretation and the imposing of structure on the data, driven by the goals and purposes of the BI team. The loaded BI target database is then made available to power users and general users through the application of intelligent tools for structuring queries.

This brief case study provides a platform for introducing and discussing the range of issues associated with business intelligence and business analytics. The presentation of the case study is followed by a discussion of key areas for reflection, and concludes with challenge to address the dangers of pseudo-objectivity which accompany BI.

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2. Case study

Magroup (pseudonym) is a joint venture between three magazine publishing companies which distributes magazines to retailers and accounts for 28% in value of the magazine market. Magroup manages the process entirely through outsourcing to a major carrier, wholesalers, finishing houses and retailers. Magroup does not own fleets of vehicles or warehouses, but effectively manages relationships and people. It uses the aggregate buying power of three magazine groups to generate economies of scale.

The magazine publishing industry in the United Kingdom is experiencing hard times. *'For many years there was market growth. It was happy days, with things getting better every year'* (Business Intelligence Manager). A laissez-faire attitude predominated. In the last few years there has been a constant decline in magazine sales.

It was the realisation of the potential of the data daily generated for analysis that led to the development of business analytics at Magroup: *"Some years ago I read Tom Davenport's [Competing on Analytics](#) (2007). I set that out as a vision of what we should be doing. This vision was set out and we have moved forward in the last four years."* (BI Manager).

Additionally, business analytics offered the possibility of pursuing continuous process and performance improvements in a very competitive market: *'Now the focus on every aspect of the business is much more intense, all the ins and outs of performance are examined. We have to be leaner and smarter, quicker to respond to market changes. Efficiency and smarter decision-making drive competitive advantage.'*

The process of magazine distribution starts with the printers. Magazines are transported from the printers to two major wholesalers. Some magazines are distributed via a finisher who packages the magazine with inserts and free gifts. The logistics are outsourced to Northern Logistics (pseudonym), which offers supply chain solutions, themselves driven by IT systems and involving the monitoring of Key Performance Indicators (KPIs). The wholesalers manage the logistics between warehouses and their own shops, newsagents, and supermarkets, in all over 50,000 outlets. Once on sale, shops and newsagents have 3–4 weeks to return unsold copies to the wholesalers. The management of this supply chain, split between the printer-to-wholesaler logistics and the wholesaler distribution, requires volumes of information to run and generates volumes of information ripe for analysis.

2.1. Sourcing the BI data

The development of a data warehouse as a basis for business analytics involved Magroup in gathering raw data from a number of sources at different points in the supply chain.

Data is available from the carrier, Northern Logistics, concerning deliveries between printers and wholesalers, including when magazines were picked up, when delivered into the wholesaler.

Data is collected from wholesalers for each magazine, for every store, for every issue: how many copies received, sold and returned. Information is obtained for the rest of the market including supermarkets and newsagents. Information is obtained about other sales which are disguised so that individual sales cannot be identified. This information can be used to identify sales of the group's own magazines. However, common industry knowledge of how statistics are collected means that sales for individual magazines can be identified by reverse engineering the data. Some data is available for some retail outlets. Some retailers provide data from EPOS systems which identifies products by retail outlet. This data needs to be cleaned to remove data for non-magazine products by reference to the barcodes. Half a dozen retailers, including a large

supermarket chain, provide EPOS data which is paid for through commercial agreements.

2.2. Managing the BI data

Some data is cleaned using mature enterprise processes in the Extraction, Transformation and Load (ETL) System, which has referential integrity. Other data is less mature, remaining outside the production environment. Magroup are working on bringing all data under central control. Ten data analysts corral data, and manage the ETL processes. All data obtained is stored in an Oracle data warehouse. There is no selectivity at this stage.

Magroup are pursuing one central version of the data which, while open to interpretation, removes argument about what is the right data technically and moves on to consider meaning and consequence. *"If A and B look at different data, from very different sources, then all our time is spent discussing which one is right rather than what it means. If we agree one source, time periods etc., then we can get on with the business analysis. The point about the data is not whether it's right or wrong, but whether it's consistent"* (BI Manager).

The data model evolves over time, growing as needs change and different data sources are used. It is built in the data warehouse, rather than being derived from any corporate data model.

2.3. Reporting from the BI data

Originally, Magroup used Microstrategy, connected to Business Objects This was historically the BI tool. The problem with Microstrategy is in its performance, particularly with large amounts of data. Magroup then moved over to SAS. *"Over the last four years we have developed reporting tools for users. Extracts from the data warehouse are imported to SAS, and data from SAS is provided in Excel worksheets for end users."*

In 2009, a new architecture was proposed. This was seen as a *"paradigm shift"*. Analysts considered how data could be delivered differently.

Now the reporting tool is directly connected, directly interfaced to the data warehouse. The users will access a web interface. *"We are beginning to use Microsoft BI tools: although we are in an early stage of the learning curve. The surface for the user will be in Microsoft Sharepoint."*

This will be a thin client solution, an OLAP type solution. For many end-users, they will just receive the results of the query. There are plans to deliver BI results to any device, including mobiles and tablets.

There is still a lot of manual intervention in the BI process. Data must be delivered to remote users. *"We are emailing reports or using FTP processes. It is all very inefficient; we can end up with duplicate data sources and multiple versions of the truth."*

2.4. Users and outcomes

There are two audiences, the internal front line and the publishers. The internal team have many different requirements, which rest in different reports being supplied to different parts of the business. Most users access pre-existing reports. Power users can write their own reports. Front-line users are mostly running pre-existing reports, Power users will include the commercial analysts who write bespoke queries.

The prime KPI is market share. But each publisher and each function has its own targets, including minimising costs. One KPI concerns how much goes on sale on time. The measuring of the KPI and analysis of logistics helps Magroup to see where the process goes wrong. BI enables Magroup to examine the performance of their suppliers and can lead to negotiation with wholesalers. They can also examine the performance of the carriers and identify

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