Impact of Analytics in Financial Decision Making: Evidence from a Case Study Approach

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Abstract: This study seeks to investigate the impact of analytics in financial decision making in organizations in a rapidly growing knowledge economy. Analytics has emerged as a critical business enabler in today's competitive market place. Its application has provided businesses with the opportunity to gain a competitive advantage by leveraging the vast amount of data they have available. Analytics is not limited to a particular tool or method however; it encompasses a range of combinations and it is this element that has made analytics such a success factor. This study uses a case study approach to identify critical areas of business where analytics have played a vital role in financial decision making. Application of analytics in financial decision making is shown to streamline information resulting in making decisions more efficiently and effectively. This study provides insights in financial decision making using statistical backing which has a vast number of applications in finance functions. As such, areas such as such detecting fraud, budgeting and forecasting, risk management and customer insights need to actively apply analytical tools to better manage and enhance the information gained from these areas. This study integrates the use of information technology tools and packages with financial management with the view of enhancing financial decision flow in organizations.

Keywords: information technology; process; software; fraud; decision making

JEL Classification: G14; G31; G32; M21

1. Introduction

Business leaders from around the world and across industries are consistently questioning whether or not they are deriving the full value from the large amounts of data available to them, both internally and externally. While advances in technology allow for data to be collected more efficiently, organisations are still searching for methods or tools to extract value out of their data to enhance the organisation's competitive edge. Most often, the information extracted is used to

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make decisions that directly impact on market share, profitability, customer satisfaction and other key success factors. Therefore, the information needs to add value in order for it to be useful. This is where analytics comes into play; with its advanced statistical techniques and tools it has the potential to extract the maximum value out of the large quantities of data available. Organisations worldwide have seen the value in using analytics and have been pushing to implement it in some way in their organisations since the dawn of the new millennium. Research conducted by Lesser, Lavalle, Shockley, Hopkins, and Kruschwitz (2011) found that high performing organisations are twice as likely to make use of analytics within their organisations. This indicates that the benefits are being widely realised. These benefits are further reflected by research that shows that the analytics market experienced massive growth over the last decade and is predicted to experience robust growth over the next few years (Kalakota, 2013). Despite the prominent growth in analytics within the market place, its application remains fragmented and not fully understood. This discussion provides a practical view of how analytics has been supporting financial decision making, by using case studies to provide real-life examples. In doing this, the study aims to identify themes highlighted in the literature and projects where analytics was implemented amid a rapidly growing knowledge economy. Overall, this study asks the question: How does analytics support financial decision making?

2. Literature Review

The term analytics has no set definition and is based on perspective and business need (Natadarma, 2012). In general, analytics is referred to as the science of logical analysis. According to Davenport, Harris, & Morison (2010), the most common definition in the market place for analytics is as follows: "the extensive use of data, statistical and quantitative analysis, exploratory and predictive models, and fact-based management to drive decisions and actions". Therefore, analytics does not apply to a specific technology or technique but to a group of technologies and methods. On a similar note, Laursen and Thorlund (2010) emphasised that analytics or business analytics is not only a technical solution but encompasses three elements, namely, technological, human and business processes. A few studies have described analytics as a part of Business Intelligence (BI), which makes extensive use of analytical techniques (Bose, 2009; Negash & Gray, 2008). However, other studies have labelled analytics as nothing more than an advanced discipline of BI (Laursen & Thorlund, 2010). From a technical standpoint, BI is used to facilitate the connections in an organisation, whereas real-time information is used to support analytics. Drawing from the above definitions, analytics is a process of turning data into actions by using advanced tools and techniques. This

process was highlighted by Liberatore and Luo (2010) and is depicted in Figure 1 below.
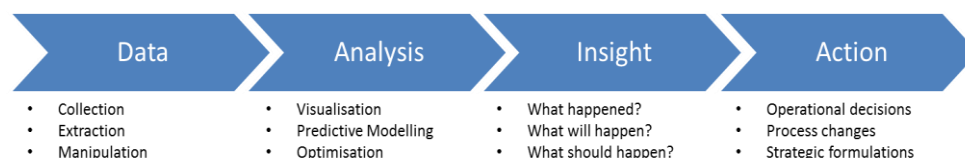
Figure 1. Analytics Process

Source: (Liberatore & Luo, 2010, p. 2)

While Figure **1** above figure may represent analytics as a simple linear process, analytics projects may not follow the identical order and the process may be iterative, especially the first two steps, where more data may be required after further analysis has been applied.

While the definition and types of analytics differ, there are some common elements found that act as drivers, which are essential no matter what analytical process is being performed. According to Liberatore and Luo (2010), the driving forces behind analytics are data, process, software and people. The declining cost of data storage and the advancement in these technologies have ignited an explosion in the amount of data organisations can process, collect and store. This led to a fundamental business process redesign with which companies aimed to increase business performance. This was done by putting more emphasis on value-added activities through improved process design (Davenport, 2013).

The use of computer software to read, analyse and present data has increased exponentially in the last two decades (Natadarma, 2012). The number of tools being offered is vast and they are extremely useful. Many vendors have included analytic tools as part of their software suites. Analytical software packages range from simple statistical tools, such as spreadsheets (e.g. Microsoft Excel), to intermediary statistical software packages (e.g. SPSS Statistics), complex intelligence suites (e.g. SAS), predictive industry applications (e.g. SPSS Modeller) and advanced reporting and analytical modules that form part of enterprise systems (e.g. Cognos). This move by vendors has increased the competition in this area, which has helped drive analytics within organisations

Finally, the demand for data-driven managers has increased drastically over the past few years (McAfee & Brynjolfsson, 2012). Many executives are now more computer literate and have strong technical backgrounds due to working through this technological boom. Therefore many, if not all companies have put an

emphasis on these applications in training staff or in the recruitment process in order to hire people with the necessary skills.

The collective impacts of these drivers have shaped the emergence of analytics and its characteristics. Analytics has become more data driven especially now that data are more available and less expensive. With the focus on process improvements as mentioned above, there has been a shift from human-made decisions to automated processes. One of the main purposes of analytics being performed is to improve processes that will lead to improvements in decision making. The software and data component of these drivers also ensure that insights and decisions are retained, which means there is continuity when decision makers move on. This is the power of analytics, however, this concept has expanded through time and to understand that, an exploration into the emergence of analytics needs to be undertaken.

3. Methodology

This study uses the case study approach in analysing the impact of analytics on financial decision making. In order to ground the understanding of the influence of analytics on decision making, case studies are used to gain a practical understanding and further demonstrate examples of information derived from the use of analytics. The data used to populate the case studies were sourced from IBM's internal intranet project reference site, however, the information used was publically available information as the data is used for external purposes and the projects used are available via the Internet to all. The names were excluded in the analysis to keep the anonymity of the companies. However, where names have been used, the information sourced is widely available via the Internet, and therefore it is not necessary to keep the company anonymous as no confidential or sensitive information is shared. The projects and information selected were based on their relevance and applicability, while the analysis of the information followed a combination of an explanation-building analytical technique and document analysis method. The goal of the explanation-building analytical technique is to analyse the information by building an explanation about the case (Yin, 2014). This technique was selected due to the complex and difficult nature of precisely measuring the areas covered (Riege, 2003). Similar to the work done by Edgar Schein (2003), which analysed the failure of a large successful computer company to sustain growth in the market, explanation building (EB) was used as the information analysis method of choice. The EB technique was used in conjunction with document analysis as they both follow the same principles. Document analysis is a form of qualitative research in which documents are interpreted by the researcher to give added voices and meaning to the research topic (Patton, 2005).

Hence, these methods were employed to derive the important themes from the selected projects in order to demonstrate these points.

4. Findings and Discussion

One of the biggest challenges in the current environment is to identify forces that drive value creation, such as financial, operational, market and competitor drivers. Failure to identify these drivers and then relate them back to organisational performance can result in companies missing market trends and falling behind. Insights from IBM's global chief financial officer (CFO) study reveal that CFOs recognise that analytics provides an advanced tool set to collect and analyse data to gain a competitive advantage in a new way, providing real-time insights across the value chain from pricing to inventory management (IBM, 2010). Mike Newman, the CFO of Office Depot, had the following to say about analytics: "Business analytics is one of our most critical Finance initiatives. We need to have the right people and tools and stay very close to the business" (IBM, 2010). There are many areas in which analytics aids financial decision making. With this vast flow of data from various sources, a large portion will have financial implications and will end up with finance departments. Therefore, the opportunity to apply analytics in decision making is huge. This also highlights the shift of the finance function, moving away from transaction processing to a more strategic advisor role. In order to get a flavour of how analytics impacts on financial decision making, a few areas only are looked at, as it would not be possible to cover all in this section. These areas also relate to some of the components of the finance function.

Although fraudulent financial statements are the most common form of fraud, there are other types of fraud, such as transaction fraud, which is common and is being effectively dealt with by insurance companies and banks. In this analysis, we cover the detection of fraudulent financial statements by drawing on a study that tested this detection by using analytical techniques. There have been numerous studies that have analysed the use of data mining methodologies in detecting fraud in financial statements (Chen & Du, 2009; Kirkos, Spathis, & Manolopoulos., 2007; Kotsiantis, Koumanakos, Tzelepis, & Tampakas, 2006; Ngai, Hu, Wong, Chen, & Sun, 2011; Phua, Lee, Smith, & Gayler, 2010; Ravisankar, Ravi, Raghava Rao, & Bose, 2011). Data mining methods include various advanced classification and prediction capabilities that use complex algorithms to process the data. These advanced methods fall directly under the realm of analytics. The study focused on, is that of Kirkos et al. (2007), which carried out an extensive examination of publicly available data gathered from various companies, in order to identify fraudulent financial statements (FFS) by making use of data mining classification techniques. The main aim of the study was to educate those in the auditing field on

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the various methods available, since detecting fraud using traditional methods has become difficult (Kirkos et al., 2007). There have also been various studies that have used analytical techniques to try to detect management malpractice or fraud, which will not be discussed further in this paper (Beasley, 1996; Fanning & Cogger, 1998; Liou & Yang, 2008).

Budgeting and forecasting are iterative processes that run concurrently in organisations (Player, 2009). However, these processes suffer from delays arising from data collection, data integrity and data distribution issues. The amount of time this information takes to be become available to analysts to make tweaks, may leave a company more than a month behind in taking corrective action. Globalisation and geographical distribution exacerbate the challenge. Moving away from more human interaction to automation allows for fewer errors to occur. In the current business environment, organisations need to be more agile with their budgeting processes. The following case study gives a practical example of a real-life implementation.

Case Study 1:

Company: Wireless Provider

Background: The Wireless Provider is one of the largest privately held wireless providers in the United States and has led the industry with innovative voice and data services. It also has a commitment to providing advanced wireless services in rural America that has long been available to those living and working in metropolitan areas.

Key Issues: The company was using Excel spreadsheets and an old general ledger system that flowed into its financial reporting tool and had no functionality or infrastructure to create a comprehensive budget. All the information needed to compile the budget was on disparate spreadsheets which were on systems not designed to handle budgeting.

Outcomes: IBM Congos TM1 solution was implemented, which is an analytics-based financial performance management and reporting software tool. According to a senior manager of the company: 'From the get-go, IBM Cognos TM1 greatly facilitated our data collection for the budget, giving us a central place for departments to input detailed information'. The finance team no longer had to manually look up invoices. Congos TM1 also allowed for referencing of individual transactions that made up totals in financial reports. The software also offered transparency and provided up-to-date information, which allowed for fast, flexible reporting and ad hoc analysis. One of the biggest benefits was the ability for the software to interface with Excel, which made it easier for the employees to get used to it.

Source: IBM Project Reference Hub

4.1 Risk Management

In the current volatile business climate, financial risk management stands out in terms of priority for many organisations. In order to meet regulatory and internal demands, accurate data as well as tools are needed in order to analyse the risk and exposure across the organisation (Cokins, 2009). Organisations need to manage the increasing data complexity with intensive analysis to be able to better respond to risks that arise in real time. However, this agility requires access to efficient computing resources that are able to perform this intensive analysis. The results must also be easily accessible to employees and managers. Solutions should provide the ability to collect and store key risk indicators, which would reduce the time needed to compute real-time risk exposures. They also include advanced visual displays and reporting tools that source information from all parts of the organisation, which enables the system or solution to provide a consolidated view of risk management exposures. The following case study provides a practical example of how an analytics solution helped with risk management.

Case Study 2:
Company: Israeli Bank
Background: Established in 1900's, Israel Bank is one of Israel's largest banks and a financial market leader with operations around the globe. In Israel, the group to which the bank belongs includes financial companies involved in investment banking, credit cards, trust services, and portfolio management. Overseas, its bank operates through branches, subsidiaries, and representative offices that primarily serve as wealth management hubs and trade enablers.
Key Issues: As the pre-eminent banking franchise the bank runs simulations on the nearly 70,000 deals it manages every day. To ensure comprehensive risk management and to liberate its traders to pursue new opportunities, the bank wanted to empower risk managers to easily assess risk and set meaningful limits on trade. Combined with increased regulatory requirements, these were the drivers that promoted the next level of risk management.
Outcomes: Using IBM Algo Market Risk, the bank's market risk team was able to run a daily batch process after hours by extracting data from the dealing room. Running a scenario-based Monte Carlo simulation, as well as historical Value at Risk (VaR), the software helped the bank to evaluate trades and risk. The bank is now able to run daily risk analysis batch processes for all positions in all portfolios, which allows them to deliver accurate information to managers in a timely manner. The head of risk for the bank, had the following to say: 'While IBM Algo Market Risk undoubtedly enables us to have a solid foundation for risk management, its value clearly extends beyond that scope.

By using it throughout the bank in numerous ways, we've realized far more advantages from the solution than we had anticipated.' The bank now has a competitive edge over other banks in Israel with the implementation of this analytics software by being in a better position to compare scenarios, anticipate potential threats and opportunities, more adequately plan, budget and forecast resources, balance risks against expected returns and work to conform to regulatory requirements.

Source: IBM Project Reference Hub

4.2 Customer Insights

The most important aspect of any organisation is its customers. Customers are the driving force behind the organisation and need to be considered in any decision made, more so in financial decisions because of the direct relationship. Customers are more empowered and connected than ever. With so much customer data available, which is continually getting richer and richer each day, organisations are pushing analytics to better understand and engage their customers (Lichtenstein, Bednall, & Adam, 2008). Organisations are now using analytics to predict and monitor customer behaviour using social media, online tracking, customer history and customer preferences. This completely changes the model for customer engagement. Predictive analytics has become a huge part of customer management, which helps predict what customers are likely to do based on what they have done in the past. With so many new tools coming into the market this has made it accessible to even the average business (Wareham, 2013). A report conducted by Forrester Research found that 80% of companies use both descriptive and predictive analytics to understand behaviour (Sridharan with Frankland & Smith, 2012). The following case study highlights how customer analytics has been practically implemented.

Case Study 3:
Company: Telecommunications Authority (TA)
Background: Established by the country's government in 1950's, TA is a dominant telecommunications provider, offering a wide range of voice and data services for businesses and consumers alike. TA offers fixed and mobile telephony, high-speed networks, television and Internet services and devices, and more.
Key Issues: TA decided to join the European Union, where it was confronted with not just intense competition but also an unprecedented opportunity to grow. To adapt to this shift in the marketplace, the telecommunications authority required a deeper understanding of its customers: who they were, which services they used, which services they needed, how much profit they

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generated. All of which could help increase customer retention, profitability, growth and market share.

Outcomes: TA implemented a range of components that made up the final solution, which included IBM SPSS Modeller and IBM SPSS statistics, one of the most popular and powerful analytics software suites. This allowed TA to make a transition from a product-centric stance to a customer-centric stance, leveraging the statistical analysis and modelling solution. By applying this solution to customer data, the organisation was able to segment its customers and prospects based on factors such as age, income, geography, service plans, spending habits and usage metrics. This allowed the organisation to predict long-term revenue of each customer and develop a targeted approach by segment. This resulted in increasing revenue and increased response rates by up to 30% from marketing campaigns.

Source: IBM Project Reference Hub

The above discussion highlights how critical analytics has become in financial decision making. Analytics-based decision making is now well recognised as providing a distinct competitive advantage, which was well illustrated in the above case studies. It has become an integral part of decision making and companies have heavily invested in a bid to make their organisations more agile in the competitive global market place. Analytics impacts on the organisation across the board, from understanding customers to improving operations. With the huge amounts of information so easily and cheaply available, analytics has grown to be a key differentiator in the market place. The adoption of analytics has unveiled a variety of new opportunities for an organisation to gain a competitive edge in the market (Laursen & Thorlund, 2010). However, it also entails some challenges that would act as barriers to the deployment of analytics. The critical success factor for adopting analytics is to closely interlink the organisation's strategy and analytics mission. This will enable the organisation to leverage analytics to strengthen the ability of business processes to meet business objectives (Laursen & Thorlund, 2010).

5. Conclusion

This paper conceptualises the term analytics by describing various definitions, looking at how analytics has been segmented and the drivers behind analytics. The common definition for analytics highlights the use of advanced statistical techniques and algorithms, in order to extract value out of information. Organisations face extremely competitive and changing market environments, and in order to remain competitive they need to be able to promptly anticipate changing market trends and opportunities. With this dynamic market place the role of

finance has shifted, and it is not merely an information processing factory but needs to operate on a more strategic level. This entails more emphasis on decision making. The role analytics plays in financial decision making is demonstrated in various areas, such as detecting fraud, budgeting and forecasting, risk management and customer insights. Application of analytics in these areas is shown to streamline information resulting in making decisions more efficiently and effectively. The case studies used highlight practical implementations of these applications and how essential they are becoming in business. Applying analytics presents an organisation with new opportunities, such as more efficient supply chains, agile financial performance, fast product innovation and better customer insights. However, at the same time, adopting analytics poses some challenges, which should be taken into account when implementing a solution. Further research could be conducted using secondary data and regression methods.

6. Acknowledgement

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