

# BIG DATA

**BUSINESS INTELLIGENCE**  
APPLICATIONS  
PRIVACY  
INFORMATION STRATEGY  
**CUSTOMER SEGMENTATION**  
PRODUCT DEVELOPMENT  
INSTORE ANALYTICS  
KNOWLEDGE CREATION  
**INCREASED PROFITABILITY**  
INSIGHTS & ANALYTICS  
TECHNOLOGY  
PRODUCT DEVELOPMENT

Syndicate Group 3

**To identify the  
opportunities and  
convert the challenges of  
Big Data to the benefit of  
Retailers**

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# **To identify the opportunities and convert the challenges of Big Data to the benefit of Retailers**

by

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## **1. EXECUTIVE SUMMARY**

Big Data can be a powerful, omnipresent influence in an organisation. Its presence can be used to shape and channel ways of operating, thinking and executing strategic direction in an organisation. In this study the researchers endeavoured to investigate the opportunities and convert the challenges of Big Data to the benefit of Retailers.

As part of our scope we are defining formalised retail in the South African context as companies with a significant number of employees on their payroll and encompass Clothing, Food and General Merchandise. We believe that Big Data will allow retailers to increase shareholder value, deliver on customer expectations and drive a systemic understanding of business needs throughout the value chain which will result in improved profitability.

To this end, researchers utilised questionnaires, group discussions, international and local retail emersions, industry experts as well as fellow colleagues using appreciative inquiry to gather primary data. Our research sample found a limited understanding of Big Data and its application within the retail environment. Although there are sophisticated systems in place, supported by line management, it is evident that retailers need more discipline, accountability to improve the usage of Big Data to enhance profitability and to be a customer centric organisation.

Research has found that Big Data opportunities lie in the area of marketing, merchandising, retail operations and new business possibilities. This however needs to be considered against the challenges which include: data management, technology, business culture, costs, lack of skills and how to deal with customer privacy.

The research was concluded with the development of recommendations, which called on retailers to start the journey of Big Data by firstly utilising their business intelligence warehouses containing structured data, then create and establish a skilled team of data scientists to deliver the insights that the business needs to use throughout the value chain. Finally, the future of Big Data insights lies in the ability of retailers to gather and interact with volatile external unstructured data.

Focused on the customer, retail leadership will have to evaluate their existing strategy, key performance indicators and business “culture” to enhance full usage of Big Data by looking at organisational alignment, discipline, accountability, employee engagement and communication.

## **2. INTRODUCTION**

The purpose of this research is to identify the opportunities and convert the challenges of Big Data to the benefit of Retailers.

The research team consists of experts within the South African retail industry. The research team has been awarded a scholarship by Wholesale and Retail Seta to pursue International Leadership program through Gordon Institute Business School and as a result of travelling in September 2013 to Canada, USA as well Kenya learnt international best practices in Retail and have brought these back home.

Over the last decade data usage has evolved tremendously. It has become evident that this will play a crucial part in day to day retail management decisions within South Africa and the global retail landscape.

The research flow will start by conducting an industry analysis on Big Data and then back it up with Literature review research where researchers consulted with the existing literature on Big Data and then table the research methodology to be employed in the research. Researchers will then identify business problems or opportunity areas, and physical studies (immersions) findings will be applied to specific business cases and finally make recommends to the opportunities and challenges that the South African Retail can embrace.

## **3. BUSINESS PROBLEM OR OPPORTUNITY AREA**

Due to the history and the evolution of Big Data, some retail organizations have unconsciously created comfort zones for themselves not to evolve with the times and the manager's behaviors was perceived as relaxed and self-serving. In addition to this, a recent article written about introduction of Radio-frequency Identification (RFID) technology reflected that Big Data technology promises to revolutionize the way we track items in supply chain, retail store, and asset management applications.

The article opposed the manner in which the retail company perceived the opportunities and challenges that come with Big Data. Up until now it was identified that Big Data investment does come at a high cost and too limited to be practical for commercial applications in certain instances.

This research should serve to provide answers and prove that there are benefits in proper usage of Big Data while also embracing its challenges. Overall retail companies could see their share value increase by mainly investing in the right tools and systems and also using them correctly. And in doing so, there will be a new “Big Data Culture” which sees the retailers achieve their strategic intent in line with their vision and mission.

### **The problem statement**

South African retailers do not perceive Big Data strategically and there is a limited understanding of how Big Data can be utilised to maximise business efficiencies, meet customer expectations and deliver overall organisational profitability and sustainability.

## **4. OBJECTIVES AND SCOPE OF PROJECT**

### **4.1. Objectives**

The objective of this study is to:

- To explore how South African Companies can utilize BIG DATA opportunities to maximize their efficiencies and meet customer expectations, thereby increasing profitability.
- To explore how the current “BIG DATA” technologies are evolving within South African companies and the challenges posed thereof.

### **4.2. Key Questions / Outcomes**

- What is the next evolution of “BIG DATA” technologies within the South African companies and its challenges?
- What kind of considerations should business leaders be considering when it comes to the choice of BIG DATA technologies?
- What kind of information do business leaders need to be able to meet customer expectations and ultimately increase profitability?
- What kind of data security is needed to ensure maximum utilisation of “BIG DATA” technologies

#### 4.3. Inputs to the Business Case

The researchers will base the business case and findings from International travel to Canada, USA and Kenya in combination with the South African retail emersion and retail interview conducted with leaders in the South African Retail. The findings will then be applied to South African retailers in helping them embrace Big DATA as part of their strategic initiative. The researchers will develop an implementation plan to aid the retailers in South Africa to embrace Big Data.

### 5. RESEARCH METHODOLOGY

This chapter describes the research methodology that will be utilized to select the appropriate sample of respondents, the research instrument and data gathering procedure as well the methods to be used to answer research question. This research will be conducted by gathering quantitative and qualitative data from selected senior managers within the South African Retail industry and drawing conclusions from the subsequent statistical analysis and data interpretation. The scientific approach involves formulating a problem, developing hypothesis and then testing and drawing conclusions.

The research will be conducted under conditions in which both qualitative and quantitative data from respondents meeting the predetermined criteria will be will collected through the use of a questionnaire. The overall research design for this study will be descriptive and will make use of interviews and questionnaires. Advantages and disadvantages for using a mixed method in research. Quantitative data gathering takes long to collate is quicker to analyse and to draw conclusions whereas qualitative is relatively quick to get info but takes long to transcribe and to analyse.

#### 5.1. Research method bias

The research team recognizes the potential research method bias which could prevail on the findings of this study. There is a possibility that correlations can be distorted due to the general bias influence. The researcher will make an effort to minimise common method bias in the study.

#### 5.2. Sampling

The research team will use the sampling method determined by Gordon Institute of Business Science as this will be a fair representation of the retail population in Canada and USA.

### 5.2.1. International and South African sample size and population

The sample population consisted of the following:

**Canada:** Hudson Bay Company, Canadian Tire, China Town, Loblaws, No Frills, and KPMG

**USA:** Macy's, Wegmans, Walmart, Anheuser-Busch Inbev, REI Distribution centre, KMPG

**SOUTH AFRICA:** Makro, Woolworths and Edcon

## 5.3. Research Procedure

Secondary data was gathered via extensive literature review. The outcome of said review was also utilized to inform the researchers as to the data analysis and meaningfulness.

### 5.3.1. Primary Data Collection Methods

The primary data for this study would be collected via the use of two data gathering tools, namely both Open and Closed-ended Questionnaire, focus group questionnaire pro-forma using Appreciative Inquiry Interviews.

## 6. Literature Review

### 6.1.1. Retail

According to the South African Labour department; the “wholesale and retail sector” means the sector in which employers and employees are mainly or wholly associated for the purpose of procuring products from any supplier or manufacturer for the purpose of sale to any person, whether on a wholesale or retail basis; and, in addition, includes –

(a) any other activities engaged in by an employer in the wholesale and retail sector including, but not limited to, merchandising, warehousing or distribution operations that are incidental to, or supportive of, the employer's enterprise; and

(b) any other activity conducted by an employer whose core business falls within in the wholesale and retail sector on or at the premises where that business is conducted. (Department of Labour, 1997).

The researchers opted to define “retail” as retail companies with at least five thousand employees on their payroll. For the purpose of this research, retail is limited to Clothing, Food, General Merchandise, FMCG as well as hard lines for big companies

### 6.1.2. Big Data

Big data[1][2] is the term for a collection of data sets so large and complex that it becomes difficult



to process using on-hand database management tools or traditional data processing applications. The trend to larger data sets is due to the additional information derivable from analysis of a single large set of related data, as compared to separate smaller sets with the same total amount of data, allowing correlations to be found to "spot business trends, determine quality of research, prevent diseases, link legal citations, combat crime, and determine real-time roadway traffic conditions (Wikipedia, n.d.).

However, Gartner argues that Big DATA is defines as high volume, velocity and variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making, given the fact that every day we create 2.5 quintillion bytes of data – so much that 90% of the data in the world today has been created in the last two years alone. (Zettaset, 2013)

Furthermore according to IBM, 80% of the data captured today is unstructured, from sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals, to name a few. All of this unstructured data is Big Data. (Zettaset, 2013)

Some of the Questions that arise when addressing Big DATA according to (Brown, et al., 2011) are:

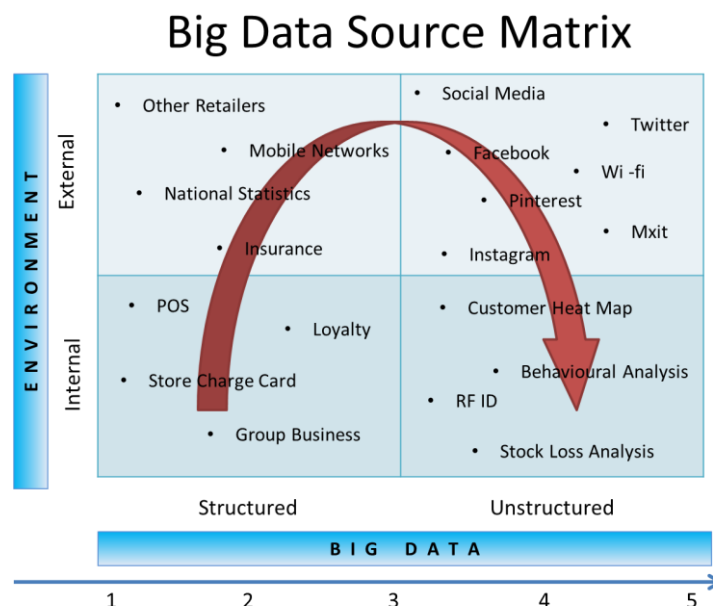
- What happens in a world of radical transparency, with data widely available?
- If you could test all of your decisions, how would that change the way you compete?
- How would your business change if you used big data for widespread, real-time customization?
- How can big data augment or even replace management?
- Could you create a new business model based on data?

### 6.1.3. Own Definition of Big Data in Retail

**Definition:** Big Data in retail refers to structured and unstructured variable data that requires techniques to capture, to process and analyse large volumes of data in a reasonable time.

This data is used to drive or enable benefits to organisations in the area of improved sales, productivity, demand planning, supply chain efficiencies, direct micro marketing, operations and cost reductions in lines with Strategic business initiatives or driving profitability & increasing shareholder wealth

### 6.1.4. Big Data source matrix and journey



The Big Data source matrix provides valuable insight into the sources and the journey that retailers can expect. It is developed sequentially to progressively manage various stages of big data analytics and evolution over time.

The matrix consists of 4 quadrants and looks at 2 axes, namely Big Data and the retail environment. The 4 quadrants are: Big Data – Structured and Unstructured and Environment – Internal and External. Internal Structured Big Data can be defined as set data fields that are gathered within the stores and are generally housed in the retailer's data warehouse. External Structured Big Data is housed outside of the retailer but contains the same tabular format, focusing of specific transactions. External Unstructured Big Data is the new frontier where volatile yet informative data can be analysed. The data sits externally in sources such as social media. Internal Unstructured Big Data can be defined as data which can be sourced within the retailer through video technology and a process of heat mapping. The explanations of each matrix are as follows:

#### **Internal Structured Big Data:**

Most retailers have significant sets of data in its data warehouse that is gathered through various internal sources. They contain valuable sets of information that can be used to associate buying patterns in order to create a set of customer segments and product associations with the segment. Point of Sale, Loyalty, Store Charge Card and other transactional data that the business may possess are good sources to start your big data journey on. Retailers have already invested in data warehousing solutions and have some form of Business Intelligence. If they are able to define their strategy and agree on the outputs in an exception format, then individual business units can start applying this intelligence to their areas and deliver to the Key Performance Indicators. At this early, yet significant stage, the retailer should be able to deliver improved buying patterns and efficiencies within its value chain.

#### **External Structured Big Data:**

An opportunity exists in the broader retail sector to form key partnerships with external partners such as the banking, insurance and cellular industry. If retailers can gain a foothold in these industries such as the association between Absa and Woolworths, it will open up another source to gather data which can be analysed within a complementary format. The existing customer privacy laws should always be taken into account. South African laws such as the Consumer Protection Act (CPA) or the proposed Protection of Personal Information (POPI) must be complied with. However, if retailers work within the parameters of the laws, they should be able to tap in structured data sources that will be able to bring additional value to the business.

**External Unstructured Big Data:**

This is new area of analytics that could provide the greatest source of information for retailers as it allows for insights into customer shopping behaviours, lifestyles, associations and psychology. The global nature of social media through Facebook, Twitter, and Instagram etc. allows one to create a lifestyle profile which can be used to provide differentiated service and products that are more tailor made to their specific needs. The domain of analytics and the web allows one to market to a bigger segment and also receive real time information giving one the chance to respond appropriately to opportunities and challenges that are directed towards retailers.

**Internal Structured Big Data:**

New technologies are being developed to manage customer flow and service within the retail space. This includes the use of RF-ID and heat mapping which uses new technology to provide behavioural scientific insights into “how” customers shop and the timing of their decisions. Heat mapping is a technology which looks at the linger patterns of customers around different areas in the shop. It allows one to see the body movements and the way a customer interacts with products. Retailers can also look at the flow within the store, bottlenecks and the positioning of departments and products during promotions or outside of them. Predictive analytics also gives real time information into store or customer KPI’s and could even predict the time on average it takes to shop and whether current staffing models at till points are sufficient to meet the demand. The system can warn store management of the time the “rush” is about to occur.

**Definition: Big Data****7. RESULTS****7.1. Challenges and Opportunities**

One may argue that in the last Decade global trends have been shifting towards increased data management and hence the importance of Big DATA, however Big DATA on its own comes with its challenges and opportunities.

It is evident that companies are finding it necessary to have accurate predictions of the future to ensure sustainability and financial health. Big DATA can then be used as one of the adding mechanism by sorting and analysing this data to give valuable insights of the future. Even though

(Zettaset, 2013) stated that 80% of this Big DATA is unstructured, this will require formatting that it will make it suitable for data mining and analysis which could lead to a risk of manipulation.

Big data is big and moves fast, often beyond processing capacities of conventional database systems. Organisations have to make a conscious decision in choosing an alternative which will derive maximum returns for the business for example, do we outsource or do we control in house?

“The challenges include capture, duration, storage,[3] search, sharing, transfer, analysis,[4] and visualization” (Wikipedia, n.d.)

#### **7.1.1. Opportunities**

**Business Opportunities: Enabling insights, driving sales.**

Big Data presents exciting opportunities for retailers who have to find new and innovative ways to not just retain but also grow market share in an ever demanding retail environment. Customers have also become far more discerning and are no longer prepared to forgive poor availability, service or the lack of products that no longer suit their needs. Customers are becoming more technologically savvy and are looking for value added experiences and relationships founded in integrity.

This is where the analytics of Big Data in conjunction with business strategy can deliver the necessary growth for business today. In the section we will outline the opportunities that retailers can derive from Big Data. The following areas will be covered:

##### **1. Marketing**

- a. Generating Customer Loyalty
- b. Effective Marketing Campaigns
- c. Micro Segmentation
- d. In-store Analytics

##### **2. Merchandising**

- a. Price optimisation and Inventory management
- b. Predictive planning
- c. New product development
- d. Assortment Optimisation

##### **3. Retail Operations**

- a. Improved business efficiencies
- b. Electronic monitoring of customer behaviour

##### **4. New Business Opportunities**

- a. Expanding Business Boundaries
- b. New Sector Employment and Job creation

## 1. MARKETING

**Generating Customer Loyalty** can allow the retailer to build a long term relationships with its customers. The loyalty programme must be designed in such a way that both the customer and retailer benefits from the relationship, The company by obtaining the customer shopping behaviours and patterns and the customer by leveraging targeted and exclusive offers. The company would therefore be able to place use the data in order to do proper customer segmentation. They would be able to access customer profiles and product information, understand and play with trends of customer behaviour and ensure their continued relevance and survival in a highly competitive market. Generating Customer Loyalty – Allows retailers to make instantaneous recommendations and advertisements to customers, thereby improving merchandise sales and associated services can also leverage unused data assets such as surveillance videos to improve shop floors design, thus improving customer satisfaction. (Srinivasan, 2012)



**Effective Marketing Campaigns** target the right audience based on shopping patterns & behaviours.

Retailers are therefore able to make timely and relevant offers to customers at crucial touch points to drive sales and ensure customer loyalty. Studies indicate that over a billion people will be using smartphones by 2016; it opens up unexplored avenues of innovation. Effective Marketing Campaigns mean that retailers need the flexibility to adjust campaigns to target the right audience through deep analysis of market trends and customer behaviour. Big data solutions maximise the campaign effectiveness by providing a 360-degree customer view and analysing customer actions. (Srinivasan, 2012)

**Micro Segmentation occurs when customer data is collected from various sources.** This enables better and granular customer segmentation. Customer data can also be received through specific marketing campaigns. These types of endeavours enable retailer's higher success rates and create a fundamental change in how retailers market and promote their products to avoid mass promotions and coupon proliferation. Loyalty cards are a good source of data in that they allow businesses to collect fine grained data on customer profiles which lead to significant changes in the retail market.

Customer data can lead to dramatic improvements in loyalty, as well as more effective methods for enticing customers away from rivals. (Srinivasan, 2012)

**In-store analytics can provide** real time insights which enable quick decision making for generating true business value. Promotions at the moment of truth at the ***Point Of Sale (POS)*** through in-store analytics as well as self and mobile-based check-out devices, thereby improving the conversion rate at which retailers are able to incentivise, cross sell and link associated products to each other and offer exclusive recommendations and offers to customers. (Srinivasan, 2012)

## 2. MERCHANDISING

**Price Optimisation and Inventory management** are critical when identifying trends and working toward availability that meets sales targets and customer demand. The retailers ability to analyse sales, pricing structure, customer and external demographics and even weather data will allow its buying and planning teams to create a product selection that is specifically geared towards identified customer segments as the products and ranges will be created according to customer needs with the necessary features and benefits that will add value to the customers experience.

The timing of price mark downs or clearance sales can assist with inventory management and determining the elasticity of prices based on history and sell-off rates will allow improved stock turns and overall profitability. Markdowns can also be targeted at different stores and the movement of merchandise prior to the clearance sale will ensure an equitable sell-off rate across stores that traditionally have higher markdown costs based on the incorrect allocation of stock at range or size.

Price Optimization and Inventory Management - Promotes real-time transparency, predictive alerts within the supply chain, and uncovers local / global supply demand trends. This optimizes inventory, minimizes inefficiencies – Inventory can be redistributed to stores where it is required. (Srinivasan, 2012)

Big Data analysis would also allow the monitoring of competitor pricing strategies that should provide the retailer the opportunity to respond. In a multi-channel retail environment, the opportunity for retailers to gather customer data and buying patterns in response to price preferential discounts or vouchers in real time or segmented prices and roll this out throughout its brick and mortar chains becomes a valuable response to generate additional sales.

**Predictive Demand Planning** by retailers is the analysis of its data base during which it identifies and assesses customer behaviour patterns that affect product demand. This gives them the opportunity

to optimise the sourcing, buying, planning value chain and drive efficiencies across the entire supply chain. The net result is greater product effectiveness and satisfied customers as the retailer is able to foresee shifting market situations. Data- Driven decisions and conclusions allow business to realise productivity gains that are 5-6% more effective than other approaches. Initiatives to drive top-line and bottom line growth are key business drivers and the management and provision of greater insights through retail data analysis through predictive planning leads to an improvement in bottom line. (Srinivasan, 2012)

**New Product Development and Assortment** can be enhanced by the ability to monitor trends and patterns through having an all-inclusive accurate customer view in real time. Big data analysis “enables [retailers] the ability to tap opportunities unforeseen till now and help with new demand generation mechanisms and targeted campaigns.” The net result is sales growth as the insights allow one to work with real customer needs. However, in order to do these key quantitative and qualitative measures are needed to track and understand demand. Approaches such as these allow insights to what the customer really want, permitting retailers to create product assortments to ensure that ranges and styling are relevant and catalogued in selected outlets where the demand exists. (Srinivasan, 2012)

### **3. RETAIL OPERATIONS**

**Improved Business Efficiencies** can be achieved across the business value chain to deliver innovation, productivity, better performance and cost savings. Based on key performance indicators, retailers can evaluate its current way of doing business across the value chain. This should always be linked to strategy and the company’s balance sheet is a good starting point when evaluating the Return on Investments for projects being managed or the Return on Net Assets so that optimal performance benefits can be achieved. Evaluation of ways of working should lead to innovation, standardisation and ultimately cost savings. “Leveraging Big Data can provide an unparalleled competitive advantage to enterprises such as extreme personalisation, real-time context-aware recommendations, dynamic pricing, and improved operations and merchandising”. (Srinivasan, 2012) Improved supply chain efficiencies will assist retailers to accurately estimate demand, and be prepared to meet consumer demand and avoid stock-out situations.

**Increased optimization in supply chain** management will lead to organisational benefits but only if the data is translated into definable objectives and when trends can be translated into predictable future outcomes. A customer analytics initiative is able to give key users within the value chain insights into customer needs and behaviours using integrated customer, shopping and behavioural

data from every touch point. This allows visibility into store footfall, user demographics, conversion and buying behaviour by category and SKU. (Kinsey, 2011) Improvements would include:

1. Real time delivery management.
2. Improved order picking.
3. Better vendor management.
4. Automated product sourcing.
5. Personalized or segmented supply chain.
6. Improve customer service, and in store experience.

Technology such as In-store video intelligence analytics can be used to develop an end to end retail optimisation solution. 3VR VisionPoint Retail Analytics system offers a customisable dashboard where retailers can gain a comprehensive view of customers across various channels and adjust these goals to maximise overall business performance. The video based technology allows retailers real time intelligence and decision makers can find answers to questions such as store sales, SKU profitability, queue efficiency, loss prevention and store layout to take appropriate action to boost profits and improve customer service. (<http://www.prweb.com/releases/2014/01prweb11482024.htm>)

#### 4. NEW BUSINESS OPPORTUNITIES

**By Expanding Business Boundaries**, a retailer can expand into other industries or co-operate with another industry. Collaboration of various business entities, internal and external departments, vendors, distributors, suppliers, partners, competitors as well as out-sourced service providers such as banking. In South Africa we have examples of Woolworths and Edcon partnering with Absa bank. This enables both parties to combine customer data across all areas to develop and sell mutually cross sell beneficial products and provide opportunities to up-sell thereby creating better value propositions for customers. While the banks bring the expertise of the financial sector to manage in-store financial services, the retailers provide access to its customers in prime location with extended trading hours and an enviable footprint. A better managed debtor's book allows increased sales and the ability to gather sales data and buying trends across defined segments. The risks are also shared between the two parties. Growing Cross-Channel data volumes - Data from web tracing technologies and the analysis of social networks are becoming similarly important.

**New Sector Employment and Job creation** is possible through the expansion of Big Data



strategies and policies in retail. This will provide opportunities for employment, software and hardware development. Increasing investment in technology – investing in centralized databases and focussing on data hygiene and analytics, can increase store sales and improve analytic capabilities. In order to foster productivity growth new businesses will need to ensure that software and service providers are able to deliver high quality services. This has the potential to create value through its use in the economy and job creation.

### **7.1.2. Challenges**

The implementation, use and management of Big Data place a number of challenges on organisations. It must be stated that all of these challenges, once they have been identified are not insurmountable if recognised as part of the organisations day to day processes and future planning. We have been able to gather and highlight the challenges to Big Data as a result of academic research and discussions with specialist consultants. Key research articles by consulting houses have also been utilised.

We would like to outline the following challenges in as much as they pertain to organisations so that they are able to derive the greatest benefit out of the analytical nature of big data. We will deal with the stated list of challenges as follows:

- 1. Data Management**
  - a. Volume
  - b. Velocity
  - c. Variety
- 2. Technology**
  - a. Storage systems
  - b. Legacy systems
  - c. New analytical systems
- 3. Change Management**
  - a. Organisational strategic intent
  - b. Resistance to change
- 4. Cost**
- 5. Skills required**
- 6. Policies and Privacy**
  - a. Security
  - b. Regulations

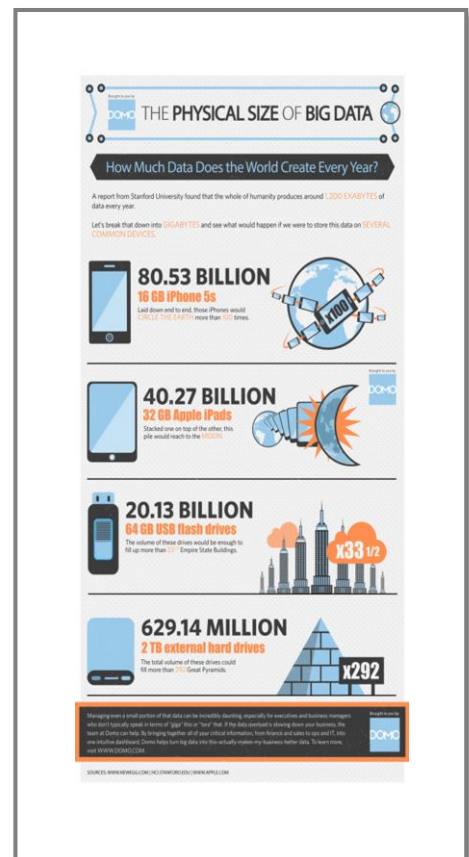
## Data Management

Data management is critical to the success of any organisation. Several factors need to be attended to such as Volume, Velocity and the Variety as data grows and expands into different directions. The following diagram provides a visual illustration: (Whatls.com, 2013)

An organisation must be able to manage the pure **Volume** of data that gets generated every day. Quantitative and qualitative measures are needed to track the outcomes. A clear understanding is required to monitor and generate real time responses. The volume of data is growing at a significant rate as the world drives an increasingly technological age. "Data is being generated, stored and consumed. All analyses, each with different methodologies and definitions, agree on one fundamental point – the amount of data in the world has been expanding rapidly and will continue to grow exponentially for the foreseeable future despite there being a question mark over how much data we, as human beings can absorb." (McKinsey and Company, 2011)

In a report presented Srinivasan and Rajeev of Infosys quotes that the world's data doubles every 18- 24 months. That is 1,8 zettabytes or 1,800 exabytes, or 1,800,00 petabytes, or 1,800,000,000 terabytes. (Infosys, 2012) It is therefore clear that every retailer will need to evaluate the extent of the volume growth within its organisation and ensure that its structures, technology and strategies are geared up to manage and derive the greatest benefit from it and use it as a wealth generator.

The **Velocity** of data, the speed with which data is growing and therefore needs to be processed is also a challenge that retailers will need to manage in order to derive real time information with which it can make intelligent decisions to drive its business forward. The retailers IT infrastructure is therefore critical, especially the size and processing speeds of its servers. This could be in the area of promotional, financial or operational activities. There is a further complexity in that retailers will need to ensure that its ability to gather and process data. There is a need for organisations to respond in relative timelines based on the strategic



initiatives that it sets for the organisation. There is a further complexity in that retailers will need to ensure that its ability to gather and process data from multiple sources.

This leads us to the question of how organisations will be able to deal with the **Variety** of data from internal as well as external sources. Variety can be defined as the number of types of data. This data can be structured, such as sales data from POS or unstructured, such as data from social media such as Facebook, Twitter etc. Retailers will therefore need to ensure that they have developed Marketing and IT competencies that are able to harness this data and turn it into intelligent information that can be translated into business trends and presented visually to teams responsible for driving certain departments within retail organisations.

Failure to fully understand and build the capacity for data management in areas such as Volume, Velocity and Variety will lead to the sub-optimal performance of retailers and impact their bottom line.

### **Technology**

Technology should also ensure that it has the **storage capacity** to manage and store large volumes of diverse data. Disk technologies are becoming more cost-effective and generally available to the public in both their private and business lives. For retailers to analyse their data, they will need a technologically advance parallel database with a Hadoop connection. The Hadoop system allows companies to add disk/storage space as needed instead of having to completely upgrade their system. This would allow retailers both a cheaper as well as more efficient hardware to access their data. (Davenport, 2013)

Retailers will need to take stock and assess their current **Legacy IT systems**. Many of these systems were installed many years ago before the current opportunities around Big Data existed. These systems are therefore not compatible and may be ill equipped to deal with the technological requirements of big data. "These legacy systems usually include multiple silos of information generated in incompatible standards and formats so that they cannot be easily integrated, accessed or analysed." (McKinsey and Company, 2011) Integrating the old systems can be more complex and costly than if one simply started a new system and they may also introduce "system bugs".

**New Analytical systems** such as Analytics 3.0 allows for increased speed of analytics and data processing. When these are built into the operational and decision frameworks, into fully integrated systems with algorithms intelligence, it delivers information that can be accessed and used with quick turnaround time. (Davenport, 2013) Retailers will therefore need to become more IT

orientated and understand the language in order to capitalise from the system advantages that these new analytical tools provide them with.

### **Change Management**

Retailers are engulfed in a world of change on all fronts. The **organisational culture** that existed many years ago may no longer be sufficient to help it navigate the torrent of change that faces retail executives today. In the past, the IT department was seen as a support service only and not as a driver of sales and growth opportunities. The McKinsey report on Big Data summarises the view as follows: “Leading companies in their use of big data understand that their IT initiatives will be a crucial source of competitive advantage. These companies must make sure that business and IT leaders collaborate closely so that the use of big data underpins improvements in efficiency and opportunities for creating value. (McKinsey and Company, 2011)

In its drive to move forward, retailers will also face huge **resistance to change** from within. In a world that is becoming technologically oriented, managers will need to undergo training, but also have a more open mind set to trying new things. It is therefore important to help decision makers in retail see the advantages for them and the actionable benefits. However, if the change is not well positioned and integrated in to the business strategy then it will always be a new initiative that is being done by another department.

### **Costs**

Finance and the **cost of implementing** and maintaining any new system will be a challenge faced by retailers. The decision to purchase of a new system should not be confined to the cost of software or licensing fees. A holistic view is needed based on your strategic plan and the context that you intend using it for. Retailers must have an exhaustive analysis of total costs and must consider costs such as hardware, storage, processing of data, managing analytical processes, system maintenance, skills required and the use of external expertise when setting up the system. Cost considerations must be evaluated over the projected life span of the system and the expected ROI. While initial costs may be low, the ongoing costs of managing the system may escalate beyond the value derived by the retailer if it is not adequately evaluated. Another “hidden” cost is that of human capital and having the expertise to configure the technology and also to produce the correct reports for key management decisions. There must be a focus on total costs in order to have the right skills, technology available for your retail business. Once retailers have been able to quantify the costs and expected benefits of big data technology, the decision should be an easy one on which path to choose. (Franks, 2013)

### **Skills required**

A recent Information Week survey indicated that 38% of the respondents identified the cost of and the **shortage of skills** as a primary concern when interviewed on what their biggest concern around using big data software. (Information week, 2012) There can be no doubt that retailers who wish to excel in the analytical field of big data require a new set of skills in data scientists as distinct from their traditional BI analysts. These individuals must have an improved set of IT skills and abilities and be able to work with the huge data sets. As big data analytics is new to most retailers, the new team must be able to explain and produce visually explainable documents for key management decisions. There is an art in not only being able to analyse the data sets but also to convey the key retail learning. Individuals must therefore have deep retail knowledge as well. Furthermore, in order for retailers to gain a strategic advantage and be able to differentiate itself, it will need to have skills that have a deep knowledge of data architecture, metadata, data quality, algorithms, dashboards etc. Change management skills are also critical in managing the relationship between executives, front line workers and data scientists. Thomas Davenport in his report for the SAS Institute has the following to say, "It goes without saying that the skills, processes, and tools necessary to manage the exploding amounts of non-standard data will become ever more scarce and important." (Davenport, 2013) Retailers will also need to look inwards and identify internal talent and have development programmes in place. They will also have to work closely with recruiters who specialise in the area of big data skills and who understand the technology and products available.

Dr Andrew Jennings in a telephonic interview with Information Week about big data skills identified the following **3 skills as critical**: Problem Solving; Communication Skills and Open mindedness. Problem solving must assist retailers to identify the real problem, the root cause that needs to be solved. The solution must deliver value and show how it is to be used and who will use it. Communication skills will be an asset as data scientists will need to be able to talk to a wide range of people from various backgrounds. They will need to convey a message that stresses how their work can deliver business value. Finally open mindedness by data experts will allow them to understand what retailers do, so that they do not come with preconceived methodologies when faced with a problem. There needs to be a level of innovation and specialisation when seeking out retail solutions. (Information week, 2012)

### **Policies and Privacy**

"With the advent of Big Data, systematic collection, storage and analysis of personal data has dramatically increased. From internet logs, user information can be extracted that is accessible for

surveillance and marketing purposes ... mobile phones send location information ... store loyalty cards allow analysing consumer behaviour” (NESSi European Union, 2012)

As social media and technology expands and becomes more accessible, retailers are able to obtain more information about their clients shopping and personal behaviours. While this is a wonderful opportunity for them, it also remains a challenge as consumers expect far more **security, corporate governance and policies** to regulate the availability, accessibility and sharing of information. Many governments have already enacted privacy laws in favour of the consumer and retailers have to gain permission in order to analyse the data. At a consumer level, personal data is considered sensitive.

At a corporate level too, companies need policies in place to manage their own data and use thereof. A huge amount of data is transferred across the web and cloud based technologies need to have adequate protection to safeguard intellectual property.

Retailers too have to ensure that they are not liable. Data hacking should be cause for major concern as technology and skills develop could detrimentally affect the **security of information**. While sets of data is often shared between departments, it is also not unknown for “research” companies to gather customer data for financial gain and sell these to corporates and retailers so that they can gain economic benefit from soliciting business and marketing a range of services and financial products such as store credit cards. In South Africa, the passing of the proposed Protection of Privacy Information and the recently promulgated Consumer Protection Act, will and has provided the consumer with more protection than before.

(McKinsey and Company, 2011)

ICON	ESSENTIAL INFORMATION	FULFILLED
	No personal data is <b>collected</b> beyond the minimum necessary for each specific purpose of the processing	
	No personal data is <b>retained</b> beyond the minimum necessary for each specific purpose of the processing	
	No personal data is <b>processed</b> for purposes other than the purpose it was provided for	
	No personal data is <b>disseminated</b> to private third parties for purposes other than the purpose it was provided for	
	No personal data is <b>sold</b>	
	No personal data is retained in <b>unencrypted</b> form	

The security and privacy of Big Data will therefore need serious consideration from retailers if they are to be trusted by the consumers, be legally compliant to government and maintain their competitive advantage in the retail market place. In South Africa, the Consumer Protection Act (CPA) and the Protection of Personal Information (POPI) will afford customers added protection over their data. However, retailers should work within this framework and will still be able to benefit.

Retailers are therefore faced with several challenges as the set about harnessing the power of Big Data for their economic growth and benefit. Those who will succeed will be the ones that have taken

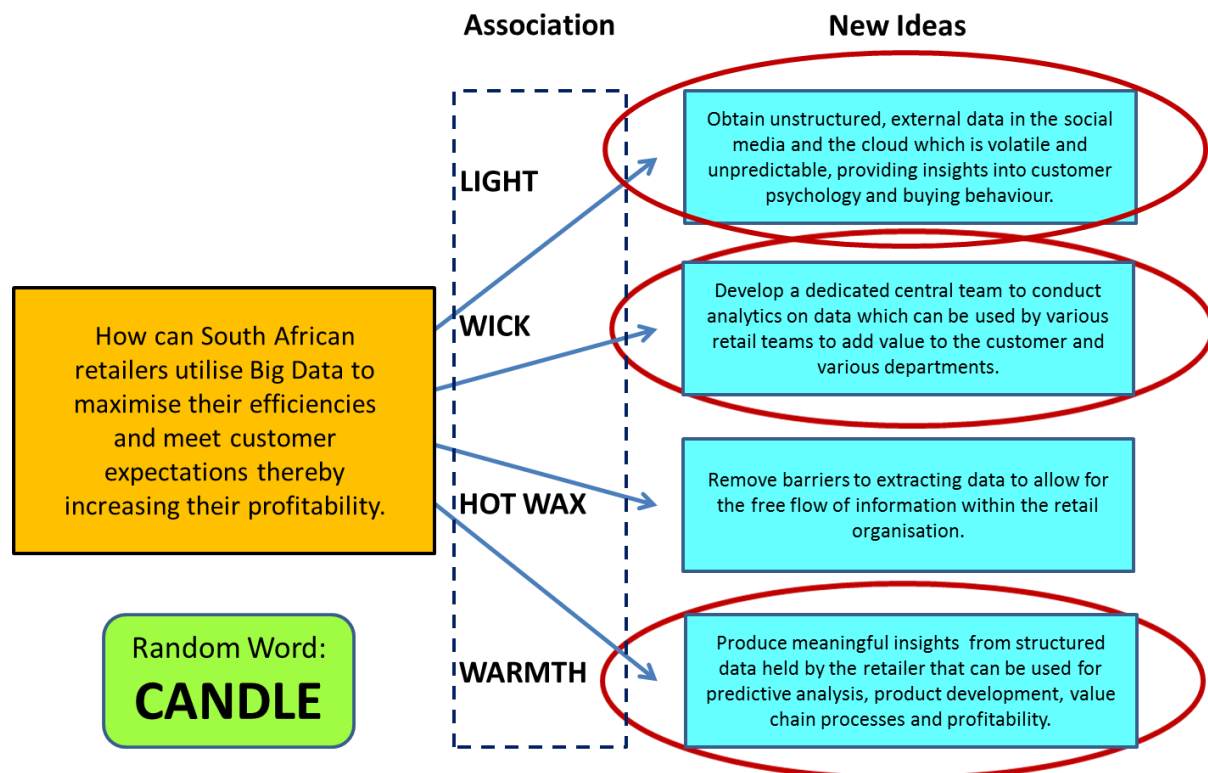
a holistic approach, mapping a proper risk analysis, clearly articulating its strategy and understanding the technology that will be able to extract wealth and increase revenue for them.

## 8. ALTERNATIVE SOLUTIONS TO THE PROBLEM / OPPORTUNITY

In order to generate 3 possible solutions, a creative technique called Random Word Tool has been used. This is a method created by Dr. Edward de Bono and is described as a “powerful lateral-thinking technique. A completely random word was chosen, e.g. Candle and associated words: Light, Wick, Warmth and Hot Wax were identified. These words were applied to and generated new insights to find answers to a problem.

In this case the 4 associated words gave the opportunity to “unpack” potential solutions, review and decide on the best way forward that would produce the most sustainable and enduring solution. Having explored 4 solutions, 3 were narrowed down and evaluated using decision making criteria in the decision making matrix which should provide the best solution to the problem.

Figure 1: Random Word Tool Technique:



The following ideas were generated which will be used as part of the final recommendations to the retail industry:

- **Idea 1: Source unstructured, volatile data external to the organisation.**
  - Obtain unstructured, external data in the social media and the cloud which is volatile and unpredictable, providing insights into customer psychology and buying behaviour.
- **Idea 2: Build an analytics competency, internally.**
  - Develop a dedicated central team to conduct analytics on data which can be used by various retail teams to add value to the customer and various departments.
- **Idea 3: Remove internal barriers.**
  - Remove barriers to extracting data to allow for the free flow of information within the retail organisation.
- **Idea 4: Source existing structured data for immediate analytics.**
  - Produce meaningful insights from structured data held by the retailer that can be used for predictive analysis, product development, value chain processes and profitability.

## 9. RECOMMENDATIONS

Having reviewed four concepts (see addendum 1) through a random word association we chose ideas 1, 2 and 4, idea 3 was eliminated. Each of these was placed in a decision making matrix to establish the best solution. This was done by identifying a set of 3 criteria and then applying a weighting process to score each of the ideas. This will give me an objective and equitable analysis through which each of the ideas can be assessed. The idea with the highest score was considered and a plan of action was agreed with specific timelines for implementation.

The process evaluated each idea by scoring it against a rating of 1 to 5 against a set of criteria which has been pre-determined. The highest score that any Idea can score is 30. The criteria chosen are: Deliver New Insights; Build greater customer associations and Time to Implement. A weighting of 1 to 3 will be applied to each criteria in order to rank the ideas. The idea with the highest score will be considered the most objective approach to implement.

Criteria	Deliver new insights	Build customer associations	Time to implement	Total
Scoring 1 – 5				
Weighting 3 - 1	3	2	1	
Idea 1 – Light	5 x 3 = 15	3 x 2 = 6	1x 1 = 1	22
Idea 2 – Wick	3 x 3 = 9	4 x 2 = 8	5 x 1 = 5	22
Idea 4 – Warmth	4x 3 = 12	5 x 2 = 10	4 x 1 = 4	26

Based on the decision making matrix above (further explained in Addendum 1) the best solution for implementation is Idea 4 – Warmth. This idea will incorporate structured data to produce meaningful insights by the retailer that can be used for predictive analysis, product development, value chain processes and profitability.

1. We therefore recommend that the **retail businesses evaluate their existing structured data sources to derive valuable customer insights**. Most retailers already have this level of data through POS, bank card machines, loyalty programmes, product data etc. This should be the first area that can be data mined on the back of strategic deliverables identified through the Board and senior business executives.

Retail businesses will need to invest in a central team that is able to conduct analytics on data which can be used by various retail teams to add value to the customer and various departments.

2. We recommend that **a skilled team of data scientists are employed to deliver the insights that the business needs to use throughout the value chain**. These data analysts need to be proficient in all the latest technology but it needs to be clear what the KPI's need to be and what format the exception reporting should be presented in so that the end users are able to apply the information with speed to their respective units.
3. The next solution is to **obtain unstructured, external data in the social media and the cloud which is volatile and unpredictable, providing new insights into customer psychology and buying behaviour. The future of Big Data insights lie in the ability to gather and interact with volatile external unstructured data**. This is data that resides in the public domain such as Facebook, twitter, cell phones and other social media spaces. Interaction with cell phones will also provide retailers with an immediate contact point of contact, not only obtaining

information but also being able to drive direct promotional activity and co-opting the customer to engage through wi-fi technology when they enter the store. This area is relatively new but will be at the forefront of new developments within 5 years in the South African retail landscape.

### 9.1.1. Financial Modeling

Based on the financial analysis of a chosen retailer in the Cape Gate store in Cape Town

#### *Key assumptions and parameters*

##### i. Discount rate

The discount rate is analogous to the investor's required return before tax Internal Rate of Return (IRR) or the rate of return on the investor equity investment, which is estimated to be 10% exceeding the prime rate of 9%.

##### ii. Initial costs

Initial costs of the investment includes cost of purchasing the hardware; software; software licence fee and installation costs

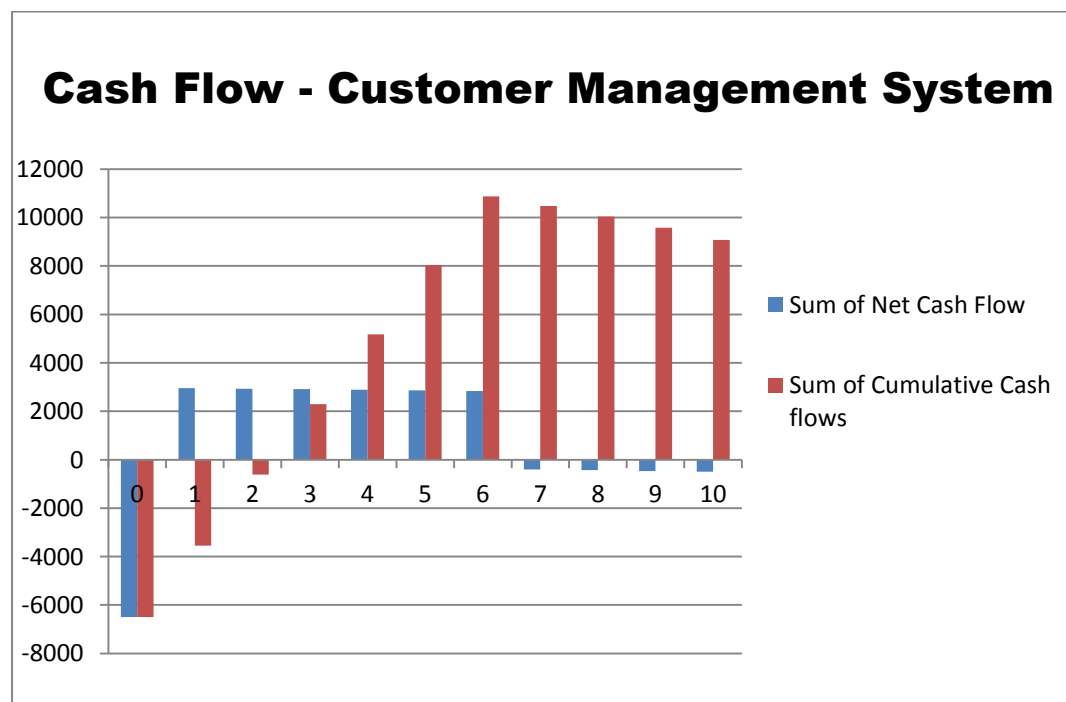
Operational Costs	Value			
Cost of equipment: Hardware	R	5,000		
Software Costs	R	800		
Software Licences	R	200		
Installation Costs	R	500		
Total	R	6,500		
Maintenance costs	R	250		
Average Sales Per Customer	R	2,166	Average per Customer	2,166.00
Incremental Sales	R	64	Number of Customers	640,000
Profit per sale	R	50		
Internal Rate of Return		10%		

Term in Years	Expenses			Income			Net Cash Flow	Cumulative Cash flows	Discount Rate @10%	Discounted Net Cash flows
	Fixed Costs	Other Costs	Total	Money Saved by project	New Sales generated by Project	Total				
0	R 6,500		R 6,500			R -	R -6,500	R -6,500	1.000	R -6,500.00
1	R -	R 250	R 250	R -	R 3,200	R 3,200	R 2,950	R -3,550	0.909	R 2,681.82
2	R -	R 270	R 270	R -	R 3,200	R 3,200	R 2,930	R -620	0.826	R 2,421.49
3	R -	R 292	R 292	R -	R 3,200	R 3,200	R 2,908	R 2,288	0.751	R 2,184.82
4	R -	R 315	R 315	R -	R 3,200	R 3,200	R 2,885	R 5,173	0.683	R 1,970.49
5	R -	R 340	R 340	R -	R 3,200	R 3,200	R 2,860	R 8,033	0.621	R 1,775.83
6	R -	R 367	R 367	R -	R 3,200	R 3,200	R 2,833	R 10,866	0.564	R 1,599.15
7	R -	R 397	R 397	R -	R -	R -	R -397	R 10,469	0.513	R -203.72
8	R -	R 428	R 428	R -	R -	R -	R -428	R 10,041	0.467	R -199.67
9	R -	R 463	R 463	R -	R -	R -	R -463	R 9,578	0.424	R -196.36
10	R -	R 500	R 500	R -	R -	R -	R -500	R 9,078	0.386	R -192.77
							9,078.00			5,341.09

This particular chain has 640,000 customers on their loyalty card with an average spend of R2,166 per month. The discounted cash flow method to calculate the Net Present Value (NPV)

In this case, if a this retail store wants to purchase an existing store a “Customer Management Systems”, it would first estimate the future cash flows that store would generate, and then discount those cash flows into one lump-sum present value amount

In this instance, the future net cash inflows are calculated and discounted using the IRR or discount rate of 10%. The discounted net cash flows reflect a positive NPV of R5,341 which is a very good investment decision from the investor point of view.



The diagram illustrates that until year Six, we will make positive cash flow but at this point in time we need to consider other forms of Technological advancements before our “Systems” becomes obsolete and we start losing money in real terms.

## 10. BUSINESS CASE

Any organisation wishing to implement Big Data as part of its strategy will need to put a business case in place so that all segments to the project can be understood and planned for accordingly. We recommend the use of the Business Canvas Model as a fresh way of understanding and unpacking various aspects of the plan. Each quadrant looks at specific areas that need careful management. We discuss this in detail below.

BUSINESS MODEL CANVAS - BIG DATA				
KEY PARTNERS	KEY ACTIVITIES	VALUE PROPOSITIONS	CUSTOMER RELATIONSHIPS	CUSTOMER SEGMENTS
<ul style="list-style-type: none"> <li>*Customers</li> <li>*Board of Directors and Exco.</li> <li>*Partnerships External IT and Data Companies.</li> <li>*Internal IT departments</li> <li>*Product areas within the business.</li> <li>*Training institutions.</li> <li>*Rewards Programme company.</li> </ul>	<ul style="list-style-type: none"> <li>* Link to the Business strategic Intent</li> <li>*Customer relationship strategy.</li> <li>*Design of KPI of Data analytics programme.</li> <li>*Extract greater value from each customer transaction.</li> </ul>	<ul style="list-style-type: none"> <li>*Price Optimisation &amp; Inventory Management.</li> <li>*In-depth Customer knowledge.</li> <li>*Create a compelling offer based on data and strategy.</li> <li>*Create an aspirational, loyal environment.</li> <li>*Product groups.</li> <li>*Stores stock allocations.</li> <li>*Defining service offer and improvements.</li> <li>*Store formats.</li> </ul>	<ul style="list-style-type: none"> <li>*Develop acquisition and retention.</li> <li>*Provide most wanted goods &amp; services to customers.</li> <li>*Anticipate fluctuations in market conditions</li> </ul>	<ul style="list-style-type: none"> <li>*Executive Board of Directors</li> <li>*Buying &amp; Planning Departments</li> <li>*Marketing Team</li> <li>*IT Department</li> <li>*Supply Chain</li> <li>*Store Operations</li> <li>*Finance</li> </ul>
	<b>KEY RESOURCES</b> <ul style="list-style-type: none"> <li>*Customers.</li> <li>*IT and Data consultants.</li> <li>*Data Analysts in Product areas.</li> <li>*Marketing</li> <li>*BI and warehousing solution.</li> </ul>		<b>CHANNELS</b> <ul style="list-style-type: none"> <li>*In-Store analytics.</li> <li>*Centralised KPI to influence buying and Planning decisions.</li> <li>*Expand the use of customer data across the organisation.</li> </ul>	
COST STRUCTURE		REVENUE STREAMS		
<ul style="list-style-type: none"> <li>*Phased approach.</li> <li>*Link to Budgeting process.</li> <li>*Form partnerships with IT consultancy.</li> <li>*Set up Business Intelligence centre.</li> <li>*Set-up costs of mainframe servers to gather and process data.</li> <li>*Higher costs of Data Analysts.</li> </ul>		<ul style="list-style-type: none"> <li>*Grow sales by gaining better insights.</li> <li>*Predictive Planning of products and services.</li> <li>*Growing data base of customer data and purchasing decisions.</li> <li>*Sale of customer data were permissible by law.</li> </ul>		

- Customer Segments** - In retail, the opportunity around Big Data revolves around better understanding your customer purchase behaviour so that your develop products, services and processes that best suits their needs which results in improved sales and profitability. Therefore the company board, buying and planning, marketing, IT, Supply Chain, Store Operations and Finance areas stand most to benefit from a comprehensive and effective business model. Each area must be clear what the strategic outcome of the data must deliver, this will ensure that the source inputs will be aligned to the growth strategy of the

business. There will also be co-operation between departments in the value chain to gain maximum value.

- **Customer Relationships** – As the customer is the most critical link in the value chain, one should start with them and continuously analyse their current and future value through their behaviours. Co-operation is critical between departments and a clear strategy around customer acquisition and retention must be conducted. This will help retailers understand the most wanted goods & services to develop for customers and the anticipation of fluctuating market conditions. Company strategy must reference the customer and each area must be able to clearly articulate how it will use Big Data to support profitability.
- **Channels** – In order to derive the benefit of Big Data, It is critical that the source of this data is clear such as In-Store analytics and external social media sources. Centralised KPI must be developed to influence Buying and planning decisions in line with the expansion and use of customer data across the organisation.
- **Value Propositions** - Big Data offers retailers a way to drive Price Optimisation & Inventory Management, In-depth Customer knowledge, ability to create a compelling offer based on data and strategy, an aspirational and loyal environment, analysis of current and future product groups, store stock allocations, defining service offer and improvements and the evaluation of store formats.
- **Key Activities** – In order for retailers to benefit from Big Data it has to follow a process to define a strategic business intent and customer relationship strategy. This must have clearly designed KPI's of their data analytics programme. This will allow them to extract greater value from each customer transaction.
- **Key Resources** – In order to maximise the benefits of Big Data the following resources would be needed: Customers; IT and Data consultants; Data Analysts in Product areas; Marketing and a BI warehousing solution and respective product departments. A good change management programme is critical to align all business areas.
- **Key Partners** - In order to implement and ultimately add value to the business, one would need to co-opt customers through rewards and loyalty programmes to allow the sharing and analytics of the information. The Board of Directors and Exco should drive and set the tone of the project and deliverables within the business. Partnerships between external IT and Data Companies and internal IT departments must work with the product teams within the business. Retailers should also get training institutions to develop programmes which will fill the current skills gap.

- **Cost Structure** – The initial investment cost of setting up Big Data infrastructure can be costly and interviews have provided estimates of between R5 to 7 million rands. This excludes the cost of resources and consultants. It is therefore important to have a phased approach after extensive evaluation by the retailer. If the decision is to go ahead and invest then the ROI for this project needs to be around 17 - 20% per annum. Clear KPI's and a detailed budgeting process must be established by a multi-functional project team set up between the approved IT consultancy and business intelligence team of the retailer. One must recognise that the set-up costs of mainframe servers to gather and process data and the costs of data analysts are expensive and above the industry norm.
- **Revenue Streams** – Enabling insights drives sales, this is achieved throughout the value chain as predictive planning of products and services deliver better value to customers. A comprehensive base of customer data drives product and purchasing decisions which should translate in incremental revenue.

## 11. IMPLEMENTATION PLAN

Organisations have developed their own style of implementing projects. We recommend the following 8 stage plan for companies to consider when implementing their Big Data project which has been adapted from Kole Hicks (Hicks, 2013). Our approach seeks to minimise the risk to the organisation while increasing the likelihood for success.



- **Stage 1: Seek executive support and sponsorship**

A Big Data project needs comprehensive investigation, analysis and proposals submitted at executive level. This can be time consuming to scope but when the necessary executive approval for the project is obtained then the strategic impact will be compromised.

- **Stage 2: Extend existing infrastructure instead of re-building**

As proposed, start with your existing data warehouse. You will need to identify and prioritise additional data sources and then determine the right technology. It is best to evaluate a few choices so that the best decision is made on the kind of technology that will best meet your organisational requirements.

- **Stage 3: Define your customer value proposition**

The customer value proposition is important. Any customer centric organisation will understand customer needs as part of the process for identifying and arranging data sources. You must connect these and make them part of your plan.

- **Stage 4: Conduct regular Agile workshops**

When you have recognised your key activities and project role players, then a decision must be made on priorities, time lines and the phased release of code. In this way you can manage the project over time and understand how to use data to influence processes and decisions throughout the value chain. Always understand the change environment and how the organisation is coping with the project.

- **Step 5: Agree on metrics and protocol**

The project team should have a defined list of KPI's derived from the business case. These should be regularly evaluated to track performance and to re-engage areas that may not be delivering or fully potentialising the customer data within their respective areas.

- **Stage 6: Link data to company process**

Your new data extracts will allow you the chance to adjust the way you supply customer products and services. Ensure that all areas of the organisation make use of the new data to make informed decisions.

- **Stage 7: Test, measure and learn**

Test all your processes and data and make sure that you keep answering the strategic questions so that your actions deliver to the strategic intent of the project. Be careful that teams do not get into a phase of analysis-paralysis as this is time consuming and detracts from delivery. Continue to engage and learn from the project through obtaining feedback from the organisation. Data extract and customer segmentation must be focused and must add value.

- **Stage 8: Map data to the customer's life cycle**

On completion of key milestones you should now be able to get more creative and map Big Data needs to each stage of the customer life cycle by asking questions like these: When a customer is discovering a product or service, where are they getting their information? How do they discover new products? Can you connect that activity to your promotional activities?

The proposed implementation plan above will allow your organisation to stay on track, transform your customer value proposition, improve sales and efficiencies and deliver increased profitability.

## **12. CONCLUSION**

South African retailers do not perceive Big Data strategically and there is a limited understanding of how Big Data can be utilised to maximise business efficiencies, meet customer expectations and deliver overall organisational profitability and sustainability. It was assumed that management does not perceive Big Data strategically. There is no clearly observable pattern of emphasis within South African Retail to suggest that strategy is informed by Big Data.

This study posed the research problem above and the questions herewith:

- To explore how South African Companies can utilize BIG DATA to take maximize their efficiencies and meet customer expectation with expectations of increasing profitability.
- To explore how "BIG DATA" technologies are evolving within South African companies and the challenges posed.

Our research has found that retailers can indeed benefit from the introduction of Big Data technologies in their organisations. While many are still at the formative stages of development, entry into this arena using existing structured data which many already possess, will benefit their profitability. Exploration of Big Data is a journey but it allows for retail science to become a reality by understanding customer behaviour. These data sets allow one to adapt products and services to the needs of customers. This builds brand loyalty and customer satisfaction.

The researchers can confidently state that the research sufficiently pursued the above structure and flow, which eventually culminated in various recommendations as discussed in the body of this chapter.

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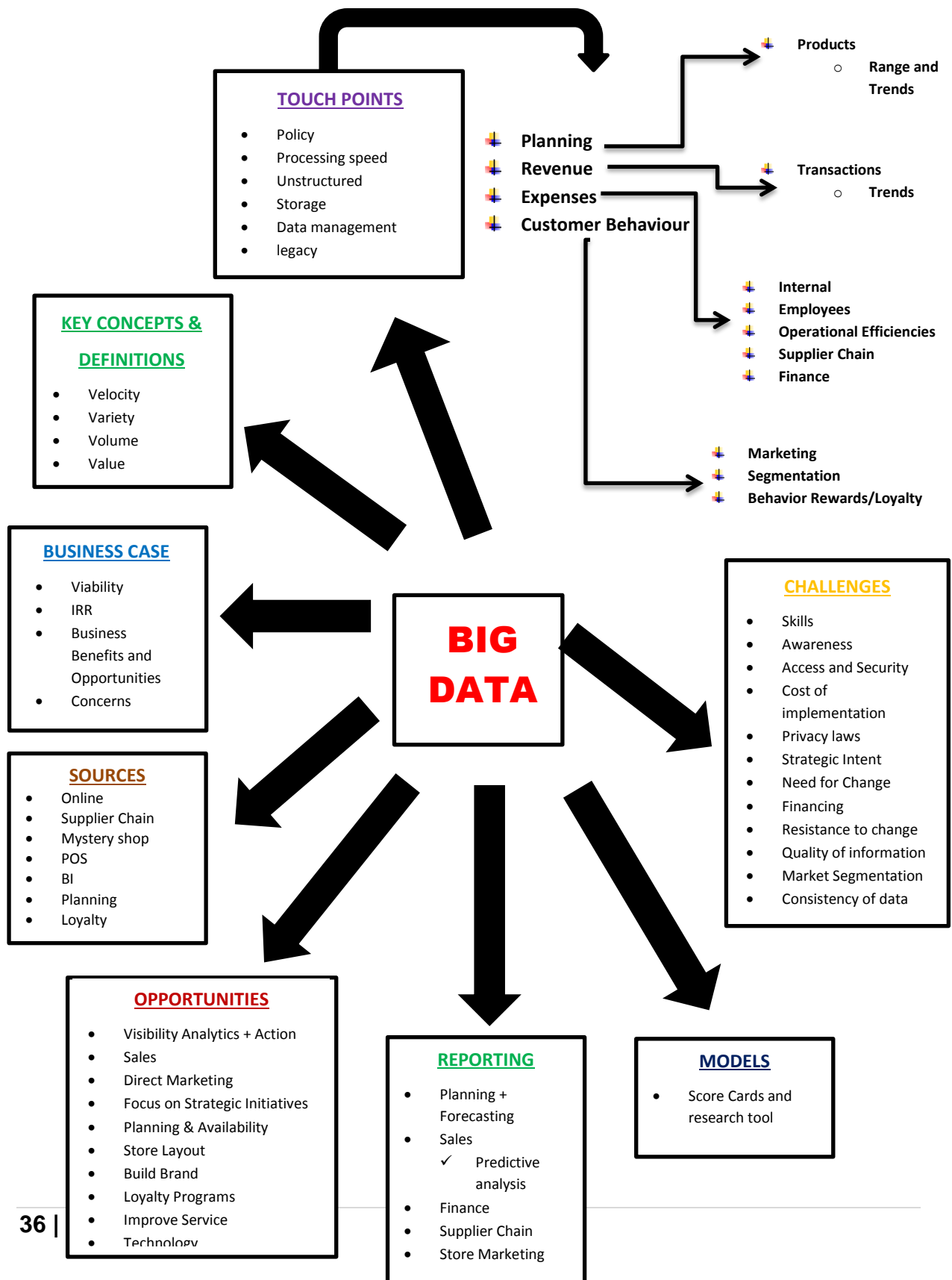
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Available at: [http://en.wikipedia.org/wiki/Big\\_data](http://en.wikipedia.org/wiki/Big_data)  
[Accessed 20 8 2013].

Zettaset, 2013. *Zettaset*. [Online]  
Available at: <http://www.zettaset.com/info-center/what-is-big-data-and-hadoop.php>

## 14. Addendums

### ADDENDUM 1 – BIG DATA BRAINSTORM DIAGRAM

# BIG DATA BRAINSTORM DIAGRAM



## **BIG DATA RESEARCH QUESTIONNAIRE**

A questioner investigating the opportunities of Big Data and how to convert the challenges of Big Data to the benefit of Retailers

Dear Respondent,

You are invited to participate in an academic research study for the purpose of writing an academic report. The purpose of the study is to understand how “Big Data” management affects the overall organisational profitability and sustainability.

The results of this study will be used for academic purposes only for the International Leadership Development Programme (ILDP). We will provide you with the summary of the findings on request.

Thanks you

ILDP Team Syndicate 3

NAME	CONSOLIDATION OF QUESTIONNAIRES		
Research Audience	Question	Leading Question	Response
Retailers	What is your understanding of Big Data?		For a long time structured data centered on collection and storage in a data warehouse. This was structured data in its purest form used by Business Intelligence as input for reporting and dashboards. However the future is moving into a world of volatile, unstructured data. This needs to be analysed and used to Retailers benefit. The area of social media and hand held devices, create an opportunity to gather data but the volume is growing at a rapid rate. Collection of high amounts of information. Significant information acquired for various data sets and transactions. Sales, customers, social media and customer behaviour. Data storage, processing and analyzing of data on a scale, not achievable with traditional technology, enable by new technology e.g. NOSQL, HADOOP. Large volumes of segments of customers, or product information that incorporates transactions, profiles, behaviours.
	How can your company use Big Data to greater effect		For companies that are in a mature phase, it is good that IT and business establish parameters and an understanding. BI will always operate under the parameters of IT. What one needs is a convergence of best practices and a clear strategic view of the future. More detail customer profiling and targeting, closer customer relationships Understanding customer's needs trends and markets. Information is power; information enables strategic management to make the correct decisions. Predictive analysis, clearance sales, modeling tool
	What are your company's challenges around using Big Data?	<ul style="list-style-type: none"> <li>• What BD systems have you put in place?</li> <li>• What skills plan did you employ to facilitate the BD analytics?</li> </ul>	Not all BD contains rich insights. Business must define its strategic views and incorporate this into deliverables. The ROI of Big Data Investment vs other revenue generating projects. Infrastructure and systems. Skills to interpret the trends and information, building an analytically competent business. Privacy and Policy. The fact that we are trying to rely too much on data without combining it with the art of merchandising to analyze customers Lacking tools, have RMS and O2. To summarize trends, disconnection between requirements, skills lacking, people unwilling to let go of history. No ability to interpret trends and provide a picture of future events. Technical decision makers do not have strong technical understanding which is a very common problem in corporates. Combination of SAP and Microsoft

			platforms to manage transactional and information systems. Skills requirement needed to ensure the capabilities and capacity. SAP BI. Analytics at Head Office working under the marketing departments analyze BIG DATA
	<b>What are the benefits of using Big Data in your company?</b>	<ul style="list-style-type: none"> <li>• Have you seen a link between the effective use of BD and financial performance?</li> <li>• What effect does BD have on customer service?</li> </ul>	Significant savings if analysis targets the balance sheets areas of growth. Provides insights that one may not have. Drive product and operational efficiencies. Not in use. Better understanding of customers, which leads to customer centricity which then leads to more market share. Merchants perform ranging and detail margin and sales analysis with the data. Customer profitability. Minimize overspending on communication to all, so when have selected channels for selected groups of customers.
	<b>What opportunities do you believe retailers can benefit from w.r.t. BD?</b>	<ul style="list-style-type: none"> <li>• Does your organisation use predictive analytics to identify trends as part of its strategy?</li> </ul>	In the past stores have depended on structured data, however, the future lies in E-Tailing where one can heat map the store and monitor customer behavior and movement to make informed decisions around product requirements and store layouts. Store efficiencies can also be improved through monitoring and assessing the information. Ad hoc process, isolated and independent. Predictive analysis Trends are too little. Change in conditions. Customer profiling and targeting. Analysts do this kind of analysis on a regular basis.

Please rank the following options from **1 - 5**, with 1 being the most important Challenge and **5** being the least important Challenge.

Challenge							
Data Management	2	2	5	1	4	3	5
Technology	5	5	5	2	5	2	5
Change Management	1	1	4	5		4	4
Costs	5	5	4	4	2	1	4
Skills	5	5	4	3	3	4	4
Policies and Privacy	3	3	4		2	2	4

NAME	MARITZA CURRY – WOOLWORTHS IT: BIG DATA		
Research Audience	Question	Leading Questions	Response
Retailers	What is your understanding of Big Data?		For a long time structured data centered on collection and storage in a data warehouse. This was structured data in its purest form used by Business Intelligence as input for reporting and dashboards. However the future is moving into a world of volatile, unstructured data. This needs to be analysed and used to Retailers benefit. The area of social media and hand held devices, create an opportunity to gather data but volume is growing at a rapid rate.
	How can your company use Big Data to greater effect?		For companies that are in a mature phase, it is good that IT and business establish parameters and an understanding. BI will always operate under the parameters of IT. What one needs is a convergence of best practices and a clear strategic view of the future.
	What are your company's challenges around using Big Data?	<ul style="list-style-type: none"> <li>What BD systems have you put in place?</li> <li>What skills plan did you employ to facilitate the BD analytics?</li> </ul>	Not all BD contains rich insights. Business must define its strategic views and incorporate this into deliverables. The ROI of Big Data Investment vs other revenue generating projects. Infrastructure and systems Skills to interpret the trends and information, building an analytically competent business. Privacy and Policy
	What are the benefits of using Big Data in your company?	<ul style="list-style-type: none"> <li>Have you seen a link between the effective use of BD and financial performance?</li> <li>What effect does BD have on customer service?</li> </ul>	Significant savings if analysis targets the balance sheets areas of growth. Provides insights that one may not have. Drive product and operational efficiencies.
	What opportunities or innovations do you believe retailers can benefit from w.r.t. BD?	<ul style="list-style-type: none"> <li>Does your organisation use predictive analytics to identify trends as part of its strategy?</li> </ul>	In the past stores have depended on structured data, however, the future lies in E-Tailing where one can heat map the store and monitor customer behavior and movement to make informed decisions around product requirements and store layouts. Store efficiencies can also be improved through monitoring and assessing the information.

Please rank the following options from 1 - 5, with 1 being the most important and 5 being the least important Challenge.

Challenge	
Data Management	2
Technology	5
Change Management	1
Costs	5
Skills	5
Policies and Privacy	3

NAME	CHRIS SOBOLEWSKI: WOOLWORTHS PLANNING CLOTHING & GENERAL MERCHANDISE		
Research Audience	Question	Leading Questions	Response
Retailers	What is your understanding of Big Data?		Significant information acquired various data sets and transactions. Sales, customers, social media and consumer behavior. Yes, highly competitive market, Consumer discerning, you have once chance to get it right. Multi-channels allows for consumer choice of shopping location.
	How can your company use Big Data to greater effect?		Predictive analysis, Clearance sale, Sell off rates, modelling tools. Planning stage Cognos application, performance cubes Predictive analysis. Efficiencies, feast/famine. Store processes, Value Chain, E2E. Stockroom, rental costs etc.
	What are your company's challenges around using Big Data?	<ul style="list-style-type: none"> <li>What BD systems have you put in place?</li> <li>What skills plan did you employ to facilitate the BD analytics?</li> </ul>	Tools lacking, have RMS and O2. To summarise trends. Disconnect between requirements, Skills lacking, people unwilling to let go of history. No ability to interpret trends and provide a picture of future events. Technical institutions do not have the necessary courses available. Ability to interpret trends for the future is lacking. Size Scalers – info in cloud, sent to India for processing.
	What are the benefits of using Big Data in your company?	<ul style="list-style-type: none"> <li>Have you seen a link between the effective use of BD and financial performance?</li> <li>What effect does BD have on customer service?</li> </ul>	Financial Performance Scenario Planning Price Sensitivity Customer service Feedback Loop, response and allocation es, Marketing, Planning, Supply Chain, Stores.
	What opportunities or innovations do you believe retailers can benefit from w.r.t. BD?	<ul style="list-style-type: none"> <li>Does your organisation use predictive analytics to identify trends as part of its strategy?</li> </ul>	Ad-hoc process, isolated and independent. Predictive Analysis. Trends too little Change in conditions

Please rank the following options from 1 - 5, with 1 being the most important Challenge and 5 being the least important Challenge.

Challenge	
Data Management	1
Technology	2
Change Management	5
Costs	4
Skills	3
Policies and Privacy	

NAME	GIRLAND CHIBAYA: SENIOR PLANNER - EDCON		
Research Audience	Question	Leading Question	Response
Retailers	What is your understanding of Big Data?		Collection of a huge amount of information.
	How can your company use Big Data to greater effect		Understand Customer needs Trends Understand markets
	What are your company's challenges around using Big Data?	<ul style="list-style-type: none"> <li>What BD systems have you put in place?</li> <li>What skills plan did you employ to facilitate the BD analytics?</li> </ul>	Main one is the fact that we are trying to rely too much on data without combining it with the art of merchandising to analyse customers.
	What are the benefits of using Big Data in your company?	<ul style="list-style-type: none"> <li>Have you seen a link between the effective use of BD and financial performance?</li> <li>What effect does BD have on customer service?</li> </ul>	Better understanding of customer needs to customer centricity which leads to more market share.
	What opportunities do you believe retailers can benefit from w.r.t. BD?	<ul style="list-style-type: none"> <li>Does your organisation use predictive analytics to identify trends as part of its strategy?</li> </ul>	Yes we do use predictive analysis.

Please rank the following options from 1 - 5, with 1 being the most important Challenge and 5 being the least important Challenge.

Challenge	
Data Management	5
Technology	5
Change Management	4
Costs	4
Skills	4
Policies and Privacy	4

NAME	MAKRO DEAL TEAM		
Research Audience	Question	Leading Question	Response
Retailers	What is your understanding of Big Data?		Large volume of segments of customer or product information that incorporates transactions, profiles, behaviours, etc.
	How can your company use Big Data to greater effect		Refer to benefits of using BD
	What are your company's challenges around using Big Data?	<ul style="list-style-type: none"> <li>What BD systems have you put in place?</li> <li>What skills plan did you employ to facilitate the BD analytics?</li> </ul>	SAP BI Analytics team at HO working under marketing
	What are the benefits of using Big Data in your company?	<ul style="list-style-type: none"> <li>Have you seen a link between the effective use of BD and financial performance?</li> <li>What effect does BD have on customer service?</li> </ul>	Data mining and understanding of customer base, behaviors, analyze purchases to do target marketing Minimize overspending on communicating to all so we have selected channels for selected groups of customer Merchants perform ranging and detail margin and sales analysis with data Customer profitability
	What opportunities do you believe retailers can benefit from w.r.t. BD?	<ul style="list-style-type: none"> <li>Does your organisation use predictive analytics to identify trends as part of its strategy?</li> </ul>	Yes, the analysts do this kind of analysis regularly for marketing, promotions planning etc...

Please rank the following options from **1 - 5**, with 1 being the most important Challenge and **5** being the least important Challenge.

Challenge	
Data Management	3
Technology	2
Change Management	4
Costs	1
Skills	4
Policies and Privacy	2