Big Data – The next frontier for innovation

Explore how businesses can uncover the hidden opportunities within Big Data and leverage these to drive informed business decisions, while enhancing customer experience and innovation.

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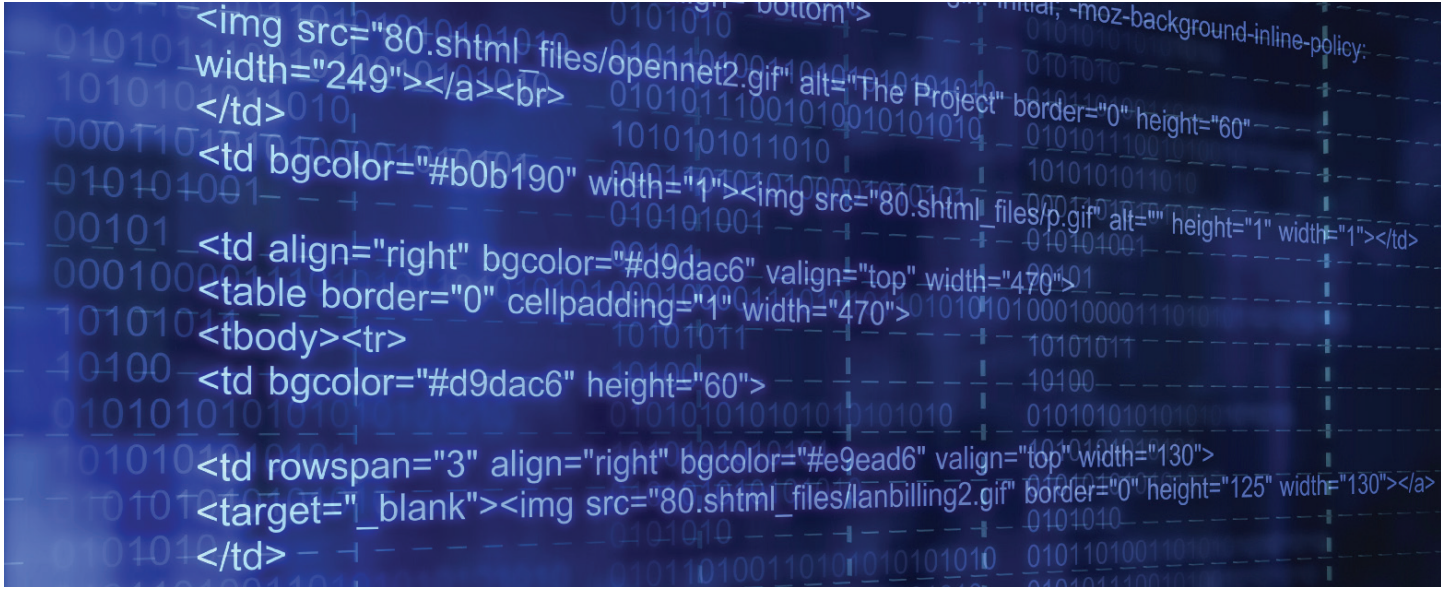


A term that is quickly trending within the rapidly evolving digital economy, Big Data represents an enormous opportunity for businesses looking to differentiate and be relevant in the current environment. Driven by the proliferation of digital channels, particularly mobile, businesses increasingly have access to a smorgasbord of insights about their customers, through which they can present personalised and targeted offerings.

As with the growth of email, the proliferation of other digital communications and service channels mean that whether your audience is business or consumer facing – they are undoubtedly hit with a barrage of information, much of which is ignored simply due to the sheer volume. In order to ensnare customers, if not already, it will become standard for businesses to present relevant, contextual and personalised information.

Imagine being able to contact a customer at the optimal time with an offering for a product in the right size, shape, colour, at a price you know they will pay, recommended by a select circle of their friends, guaranteeing delivery to them at their own convenience, with post-purchase support and service – the perfect experience for your customer.

For your business: cutting down the need for expensive broad advertising/ branding campaigns, understanding which products and services your customers want, knowing which digital marketing channels are best-suited for your business, running efficient and cost-effective supply chain and operations functions, in essence oiling a slick path to conversion and revenue growth.

This experience is not just a theory, with businesses such as restaurants now collecting data on their patrons in terms of their food and beverage preferences, allergies, dining preferences (e.g. which napkin they prefer) in order to ensure an optimised customer experience and in some cases a fluid internal operation.[1]

Not just leveraging Big Data in isolation will not result in the above retailing experience. However when considering the Consumer Adaptive Retailing model, this data will play a significant role in yielding the insights in order to make this theory a reality.

1 Smart Company, 'Lessons from the web-savvy restaurants keeping an eye on you', 6 September 2012 - http://www.smartcompany.com.au/information-technology/051611-best-of-the-web-the-web-savvy-restaurants-keeping-an-eye-on-you.html

Highlighting the increasing opportunity with Big Data, the International Data Corporation (IDC) forecasts that the global Big Data technology and services market is expected to grow to be worth USD$16.9 billion in 2015 at a compound annual growth rate (CAGR) of 40%. Which is approximately seven times that of the overall information and communications technology (ICT) market.[2]

Dan Vesset, Program Vice President, Business Analytics Solutions at IDC comments, "The Big Data market is expanding rapidly as large IT companies and startups vie for customers and market share. For technology buyers, opportunities exist to use Big Data technology to improve operational efficiency and to drive innovation."[3]

Big Data is traditionally defined as comprising of data sets that are generally beyond the capability of an organisation to capture, analyse and process. The majority of Australian businesses have been accumulating Big Data internally for years without really knowing its worth and/or how to slice it in order to make effective and timely decisions with it. Based on our internal analysis of Australian Retail and Consumer businesses, we estimate that these businesses are missing an opportunity worth $3.8 billion by not leveraging existing internal data.[4]

Value of the Australian Retail and Consumer business Big Data opportunity

Worth 1.4% of retail sales[5]

$3.8bn

Additional EBIT

$1.3bn[6] EBIT
Reduced promotional spend

Primarily achieved by using granular data at a transaction or customer level in order to execute strategically targeted merchandising and advertising campaigns.

- Fewer ineffective promotions
- More targeted direct marketing
- Avoiding unnecessary/ excessive discounts
- Avoiding unprofitable pricing for low grade customers

$2.5bn[7] EBIT
Extra revenue capture

This will be primarily achieved by using data to make real-time decisions about what to offer a customer at a critical point in their purchase decision (e.g. up-selling extra products, smarter pricing of existing products and winning purchases from competitors).

- Acquisition of higher value customers
- Better customer retention
- Smarter pricing
- Greater visitation, broader category reach
- Predicting purchasing intent

>
Greater shareholder value

A business unit that develops high quality consumer data could in itself be worth $50 - $80 per person in additional shareholder value.

- Collect
- Analyse
- Execute
- Measure

2 IDC Press Release, *'IDC Releases First Worldwide Big Data Technology and Services Market Forecast, Shows Big Data as the Next Essential Capability and a Foundation for the Intelligent Economy'*, 7 March 2012

3 IDC Press Release, *'IDC Releases First Worldwide Big Data Technology and Services Market Forecast, Shows Big Data as the Next Essential Capability and a Foundation for the Intelligent Economy'*, 7 March 2012 - http://www.idc.com/getdoc.jsp?containerId=prUS23355112

4 This estimate is based on PwC's observations of R&C businesses in Australia and the impact that companies who do invest in performance analytics are achieving in other countries.

5 Australian retail sales are worth $273bn. Additional EBIT is worth on average 1.4% of sales.

6 Savings from ineffective promotions based on savings that PwC has found in retail and consumer goods businesses through analysis of their internal datasets. Savings apply to both retail and trade promotions.

7 Value from extra revenue shows additional EBIT generated from higher revenue at both a manufacturer/supplier level and a retailer level. Based on returns that retail and consumer goods companies globally are seeing from investing in consumer data and loyalty programs and PwC observations in Australian R&C businesses.

> ***"The shallowest of views of the most limited of datasets covers 99% of the everyday decisions of any organisation."***
>
> Anthony Mittelmark, Director,
> PwC's Digital services

Breaking down Big Data

Although data and analytics have always been crucial to business process, as companies have begun to harness the power of digital channels and technologies there is an increasing amount of information being collected and available through internal and external sources.

There are many facets and channels for Big Data that can be broadly classed into the following three categories:

- **Internal data** – Consists of information that your business is collecting through its own systems and processes. This data may not be digital and can consist of both quantitative and qualitative information. Generally this data can yield the greatest insights about your existing customers and their interaction with your product and services. For example: Walmart handles more than one million customer transactions every hour, which it imports into databases estimated to contain more than 2.5 petabytes of data.[8] This information should enable the retailer to map out buyer behavour, merchandising and operational strategy.
- **Structured external data** – Though generally provided through third-party sources, this information is generally available for your use. In its raw format it may not fit readily with your existing systems. However overlaying this data over existing internal information should yield richer and contextually significant insights about both existing and potential customers. For example, Facebook processes 2.5 billion pieces of content and 500+terrabytes of data each day. The social network pulls in 2.7 billion Likes and 300 million photos per day and scan approximately 105 terabytes of data each half hour.[9] The insights that can be gleaned from this information about consumer behaviour would be significant.
- **Unstructured external data** – Much of this data is taken from sources that are not within your immediate control, however they are factors that have an impact on your business and customers. When used in combination with existing highly structured data, this information can assist to provide concise and targeted insights. For example, when a search is conducted in Google, the search engine's algorithm takes into account over 200 factors, such as relevance, social media, geography, advertising, collective popularity and so forth – in essence making sense of unstructured data outside of its control in order to deliver the most relevant results to its users.

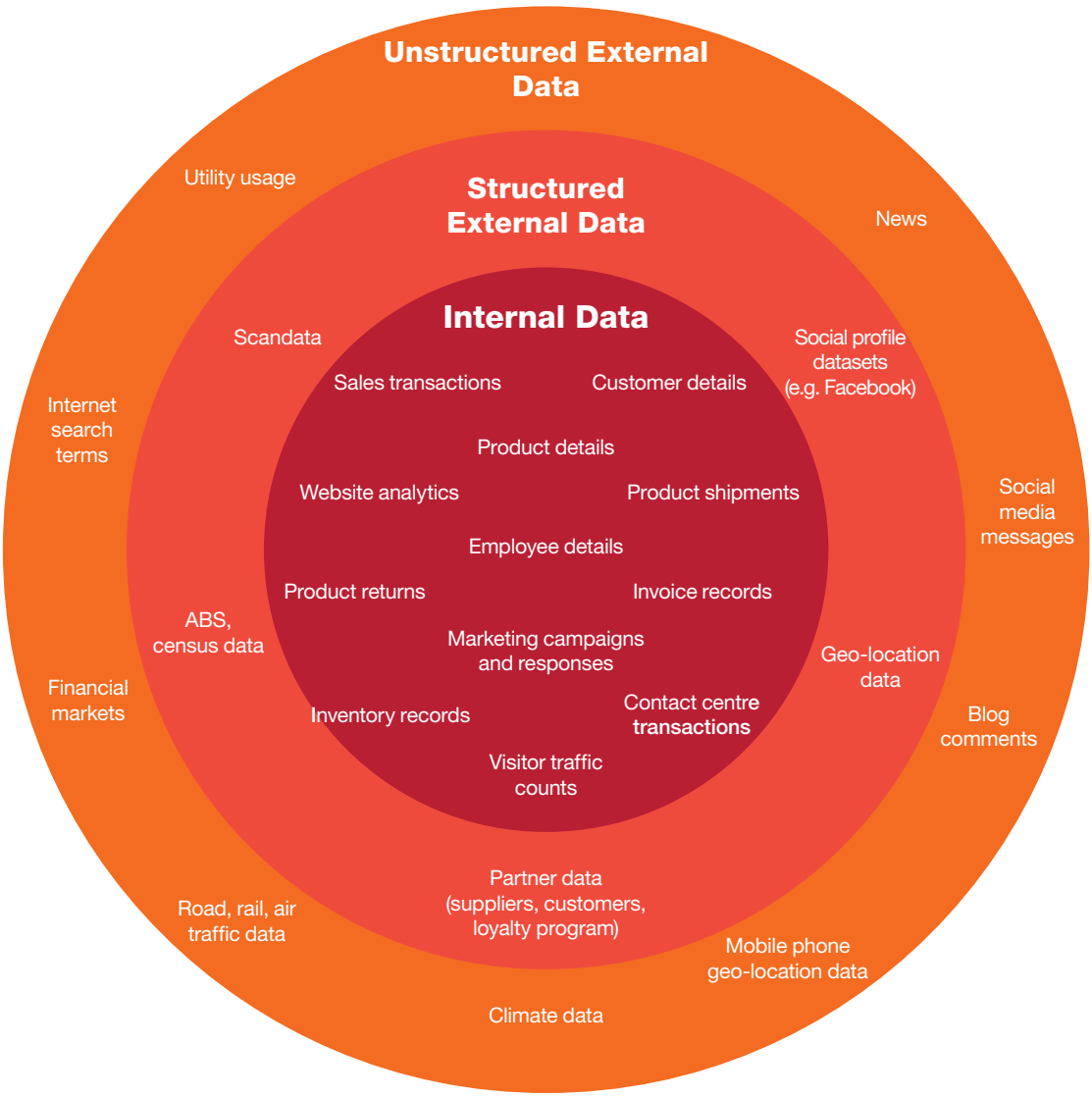
  Of these categories, internal data is likely to be the source that yields the greatest results, with the least amount of effort and cost to the business. However without firm objectives, contextual knowledge and an understanding of what insights you want to reveal – any or all of this information is seemingly meaningless.

8 SAS, 'Big Data Meets Big Data Analytics', date of publication unknown.

9 Techcrunch, *'How Big is Facebook's Data? 2.5 Billion Pieces of Content and 500+ Terabytes Ingested Every Day'*, 22 August 2012 - http://techcrunch.com/2012/08/22/how-big-is-facebooks-data-2-5-billion-pieces-of-content-and-500-terabytes-ingested-every-day/

Diagram 1. Breaking down Big Data

Organisations should start by fully using their internal data then learn to acquire and structure external data.



The path to Consumer Adaptive Retailing

For those organisations seeking to move to a Consumer Adaptive Retailing model of operation (outlined in PwC's *Future of Retail – Consumer Adaptive Retailing* whitepaper), Big Data is crucial for enabling channel specific optimisation and marketing, which will contribute to the key activity of context adaptive marketing through each channel touch point. Leveraging Big Data can also serve to enhance knowledge of potential opportunities and disruptive threats occurring within the broader networked marketplace, as well assist with operational business planning for other business functions such as supply chain and merchandising.

The majority of Australian businesses are in the early stages of developing their Big Data capability and analysis. There is however an increasing number of local organisations (particularly pure players) that are actively 'practicing' real-time decisions using their own data.

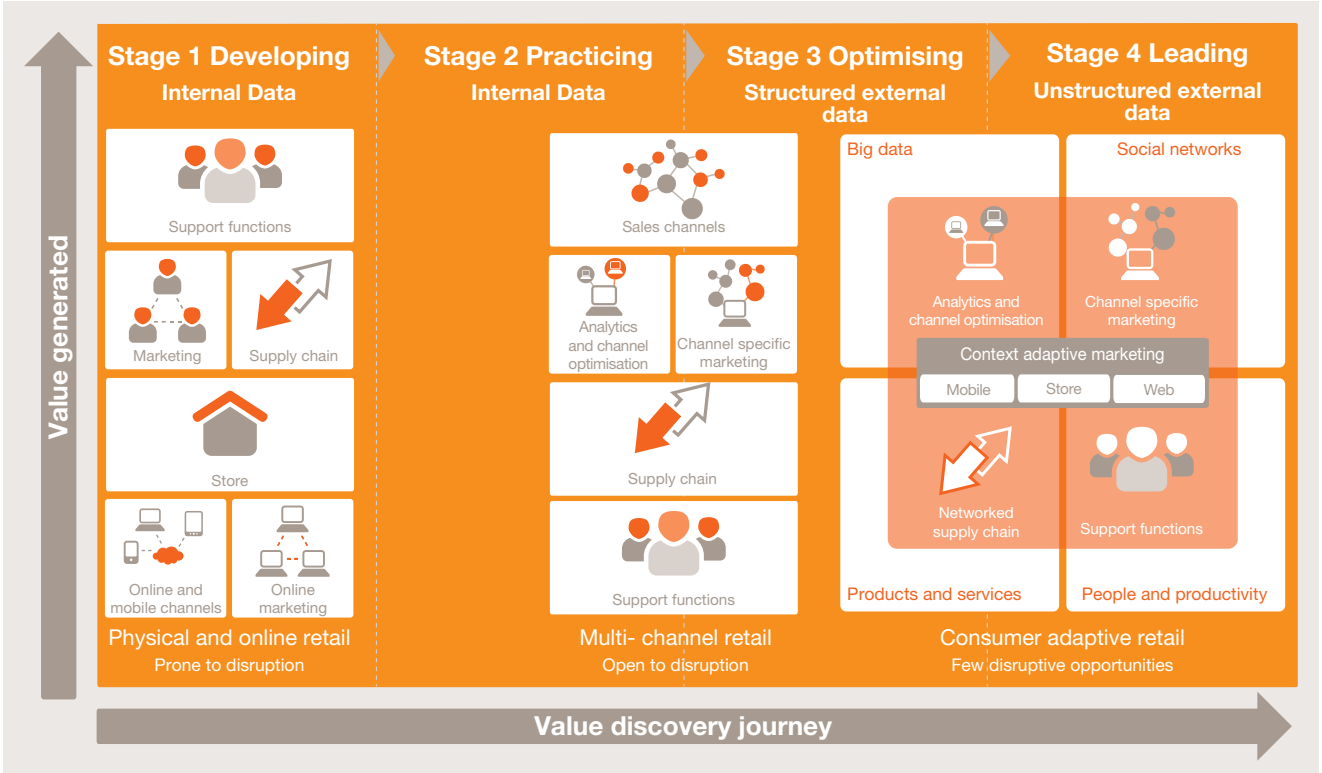
Often businesses invest millions in promotional activity, however the decisions around what to promote, to whom, when and how are not always well informed. Though important to drive sales and brand awareness, large savings opportunities from ineffective promotions can be uncovered by assessing transactional and customer data at both a mass scale and granular level. Our work with Australian businesses over 2011 and 2012 has led us to estimate that $1.3 billion in savings are available to businesses willing to invest in data driven promotion decisions. Moving to the Consumer Adaptive Retailing model, businesses will be able to further cut back on blanket promotional spend and serve relevant and targeted ads and promotions to optimally engaged customers.

This is already occurring with organisations overseas that are in the 'optimising' stage of the Big Data journey. Companies such as Gap, Tesco and Amazon are using a mix of their own data as well as structured data feeds from external sources in order to refine their promotional and merchandising efforts.

The final stage of the Big Data journey 'leading', lends itself to organisations that are operating the Consumer Adaptive Retailing model. Built on cataloguing data, Google represents an organisation that is increasingly utilising all forms of Big Data in order to build out its capabilities and position itself as a leader within existing and emerging markets.

For those organisations seeking to move to a Consumer Adaptive Retailing model of operation Big Data is crucial

Diagram 2 – Tracking the big data journey towards consumer adaptive retailing



***Consider:** An initial analytics assessment will pay for itself quickly and go on to self-fund higher cost infrastructure, process and people changes.*

Leveraging Big Data

All too often business decisions are made based on tradition, gut feel and/or on the directive of the HIPPO (highest-paid person's opinion). Though this may have once been a sound way in which to operate, with the rapid changes within the business and consumer environment it is no longer reliable.

In parallel with being able to analyse data better, the culture in many organisations needs to change from making decisions based solely on opinion and instinct to ones that use data. The question management asks needs to move from 'What do we think?' to 'What do we know?'

By investing in business intelligence systems, analytics software, marketing tools and performance analysts the majority of latent value can be realised from the data within an organisation. Databases can be linked and rule based decisions can be built.

For now those who invest in data analytics and real-time decision-making will gain competitive advantage but within five to 10 years it will be critical just to be visible within what's set to be a highly saturated market.

Further to this, being spawned in an environment where data is crucial to measurement of success, the information gathering systems, processing, analysis and implementation yielded from digital channels are also applicable within the offline realm, as evidenced through casinos.

The Advantages of Big Data from the Consumer Adaptive Retailing perspective

- Maximise yield from advertising in general, but online advertising specifically.
- Reduce the cost of sale; by targeting consumers when their propensity to buy or intent is at its highest point.
- Efficient control and management of stock volume and geography.
- Enable identification of opportunities to sell third party products and services direct to the existing consumer base.
- Optimisation of primary channels in order grow share of consumer wallet.
- Promote product that takes into account the customer's broader ecosystem and life stage to ensure relevance.
- Model and predict the success of new product offerings, including correct entry pricing, optimal geographies and mapping propensity of purchases.
- Fulfil a necessity to collect contextually specific data that will enable real-time contextually relevant offers via multiple channels.
- Facilitate innovation and assist with resolution of complex issues.

Diagram 3. Leveraging Big Data and 'CAR' in the car

Efficient emergency response

Collection and aggregation of real-time location data, will enable emergency services to be more effective responsive.

Smart routing

Navigating geography, based on real-time geo-location information.

Mapping the path to conversion

By utilising geo-locational data, business can structure stores and identify behavioural patterns to optimise the path to purchase.

Geo-targeted advertising

By leveraging geo-locational data, businesses can target consumers while on the move and in proximity of locations.

Electronic toll collection

GPS-enabled mobile devices will enable tracking and congruence of data to enable automatic charging of tolls while driving.

Data-based insurance pricing

Telematics and GPS data will enable insurers to price insurance based on actual data, rather than demographics.

Case study: Learning from the money-spinners

The ultimate offline service provider, based on games of chance and high stakes, casinos are often the most technologically, Big Data savvy organisations – tracking, processing and evaluating their patrons on a constant basis. A place where dreams are made and lost in the spin of a wheel, throw of a card or roll of the dice – casinos often adopt the most cutting-edge technologies and data processing in order to optimise and grow revenue. Some of which include[10]:

- **License plate recognition** – A camera snaps a picture of the licence plate of every car pulling into the casino, which is then compared against the plates of databases of undesirables and known gambling addicts, who are turned away before entering the building.
- **Biometric Facial Recognition** – Patrons faces are scanned as they enter the casino, 'smart systems' compare and analyse these images against images of undesirables in the casino's database and if a match is found it alerts security.
- **RFID Chips** – Many casinos now install RFID chips into their chips, which broadcast unique serial identifiers over radio frequencies, enabling the casinos to keep track of the chips, track playing data to the table level, as well as protect against fraudulent cashing of chips and theft. This technology was put into practice by Las Vegas casino the Bellagio, when $1.5 million worth of chips were stolen; the casino deactivated the RFID transmitters, rendering the chips worthless.
- **TableEye21** – combines several technologies (including video and RFID information) in order to methodically track player and table statistics, which is used in the identification and prevention of fraud and theft.
- **Non-Obvious Relationship Awareness (NORA) software** – This scans various casino databases (e.g. transactions, cheaters, employees and other 'people of interest') to assimilate and recognise relationships that may not be initially obvious – this software can be used to identify group-fraud activity. This software is also utilised by the US Department of Homeland Security to assist with the identification of links between potential terrorists.

Along with the more cutting edge technologies – casinos are also beginning to synchronise their data sources to leverage their data for sales and marketing purposes, in order to monitor patron movement especially after large events[11]:

"You can analyse crowd flow being utilised by properties these days," commented Tom Flynn, Vice President of Security and Surveillance for Caesar's Palace and the Rio in Las Vegas (quoted by Urgent Communications).

"It can be looked at for safety, convenience and marketing — understanding what guests are interested in, what they aren't. Do they go to a certain restaurant at times, go to the pit, [or to] the parking lot?"

10 *Gizmodo, '7 Casino Technologies they don't want you to know about',* 10 August 2011 - http://www.gizmodo.com.au/2011/08/7-casino-technologies-they-dont-want-you-to-know-about/

11 *Urgent Communications, 'Don't bet against the house'*, 1 August 2011 - http://urgentcomm.com/networks_and_systems/mag/casino-video-surveillance-systems-201108

Table 1. Examining the Big Data process from a casino's perspective

Question	Objective	Data Type	Source for accumulation of data
Who are our known customers?	• Establish repeat marketing opportunities by growing knowledge of existing and potential users. • Establish preferences, purchase intent and sentiment for targeted marketing of products and services. • Identify and remove/block unwanted patrons through established database. • Strengthen fraud or anomaly detection through behavioural modelling.	Internal	Hotel bookings, credit cards payments, loyalty and membership programs, video information, facial recognition, biometric identifiers (e.g. heart rate and temperature tracking), employee added real-time information.
Who are our unknown customers?		Internal	Video information, facial recognition, behavioural analysis, purchases, and potentially even sentiment can be tracked (although these customers are unknown they can be marketed to while in the facility with a high degree of accuracy).
What is the pattern of usage of our known users?	• Understand behaviour, intent and sentiment in order to provide targeted relevant incentives and dis-incentivise non-commercial behaviour. • Validate operational planning (e.g. security, safety and procurement requirements).	Internal	Payment authentication by terminal location, membership recognition, points added to loyalty application on mobile device by terminal location/on which products, booking of services, reservations at restaurants and hotels, buying behaviour.
What is the pattern of usage of our unknown users?		Internal	Bar, restaurant visits, movement throughout the facility (repeat visits, repeated patterns and divergence from pattern), time in and time out, significant event correlation.
How can we identify potential clients from website and mobile usage?	• Assess usability and performance of web and mobile properties and digital marketing. • Establish user segment profiles for web and mobile. • Identify new opportunities to engage patrons via web and mobile devices.	Internal and External	Examine pages viewed; add cookies and track movements (e.g. which pages did the user and products/ services were viewed, check against desired databases, check upstream and downstream sites, etc.). If known/unknown, match user against registered user base of online gambling assets and tag accordingly.

Big Data in action

Google

Perhaps the best example of a Big Data powerhouse is search giant, Google. Not only does its search engine index a multitude of data and information, Google has evolved its services in order to take advantage of this data and serve up personalised and targeted offers to its users and clients. With its recently launched personalised browser experience, Google has found a way to not only add value to its users by offering convenience, but funnel another channel for its collection of data.

Zappos

Online retailer Zappos owned by Amazon and crowned the 'King of Customer Service' delivers a 'wow through service' by empowering its employees as well as customers through aggregated customer data and insight. A large part of Zappos' analytic resource is focused on what people are saying in social media and elsewhere on the internet about shoes in general and Zappos in particularly. By identifying what people are looking for, what they are not happy about, they can change their product range so their target customers will find what they are looking for. Less than 90% of customer provide direct product feedback or engage directly through the call centre, so this wider data mining is essential to reading the market and customer sentiment.

partypoker

Bwin Party the world's largest online gaming business, has been testing real-time segmentation as its website loads in the user's browser. By scanning browser history, it determines the probability that the user fits various customer segments and displays a page customised to their predicted profile. For example, based on gender, the site will display images that are more likely to appeal to male rather than female. If it determines that the user is an experienced gamer who generally uses a key competitor's site, it will display a more valuable offer than normal.

Best Buy

Best Buy used all their online transaction data, geo-spatial data to build a bottom-up segmentation of their customer base to identify the key characteristics and behaviours of that suggested someone was a 'good' or 'bad' customer. They applied this not only to their online customers but simplified it for use offline by their staff and agents. Each simplified 'persona' could be used to teach staff how to encourage the right buying outcomes. The results: 7% of customers drive 43% of sales volume.

Amazon

Approximately 30% of Amazon's sales are generated through its recommendation engine. The company leverages strong analytics and real-time decisioning to proactively create compelling cross-sell offers based on customer needs. Additionally, Amazon's 'one-click' purchase has made it simpler for customers to buy from them across a number of channels (e.g. Kindle, web, mobile) without having to re-enter credit card details.

Apple

Apple deploys sophisticated customer analytics through the iTunes Store 'Genius' feature from the initial use. It does this by proactively suggesting music/video/media content for the user based on his/her content library. From the first time a user connects their device, Apple collects demographic information to better assist users to set up their device, register for personalised support and customise the product.

AT&T

AT&T coordinates customer management communications centrally across the organisation. This increases consistency and relevance for customers and reduces the cost of customer interactions. Additionally, AT&T uses network analytics to predict and remedy mobile customer service issues (often before the customer is aware of the problem) and uses post-sale follow up calls to ensure customer satisfaction.

Gap/Visa

Gap's Mobile4U combines data from Visa card transactions with purchase and customer profile data from Gap to create geo-locational targeted promotions. This technology apparently transcends international borders, where a PwC employee who had signed up to the program in the US, received a promotional offer for the local Gap when using their Visa card while shopping at Chadstone in Melbourne.

The new social contract – Transparency is key

Australia has relatively strong data privacy laws and concerns about privacy and what organisations are doing with data are never far from the media. There are clear signs that the debate is changing from one about privacy to one about transparency.

Consumers are becoming willing to allow organisations access to their behaviours and purchasing patterns provided that they get value in return. In effect this is a new social contract between business and consumers, one that business must honour to maintain trust and the right to commercially use that data.

The change is has a clear generational divide at the moment with Generation 'Y' and 'Z' more willing to share their data. We expect this to tip into older generations over the next few years, in line with a more general digital tipping point in society.

In the UK, the government has got onto the front foot and proposed that consumers should be able to access the data that businesses build on them. Google, MasterCard and British Gas are three of 26 major companies that are promoting the project as they ultimately believe it will deliver much stronger consumer engagement when people can get value from the data.

Some of the examples include[13]:

- Post-purchase transparency – providing electronic purchase receipts for consumers to download and keep as a record for guarantees, defects and faults.
- Financial behavioural identification - services to manage budgets, which allow consumers to monitor spending on certain items, categories, brands or companies, as well as identification of trends in their spending.
- Retail tendering – enabling personalised tariff lists that allow consumers to specify what they want for various services (e.g. gas, electricity, broadband and mobile services) and then leaving it to businesses to make offers that suit them.

13 BBC News Technology, 'Midata project plan for compulsory customer data', 22 August 2012 - http://www.bbc.co.uk/news/technology-19331302

Security and privacy

Diagram 4: Are you doing enough to manage your reputation risks?

*Do you have **a clear understanding** of your data security and privacy risks?*	*How do you know **controls** are working effectively*	*Do you have a clear picture of what you think **'enough' security** is?*	*Do you have **a strategy** and the right **processes** and mechanisms to execute your data security and privacy strategy?*
*Do you ensure your **3rd party providers** and **partners** are on the same page? How will you manage the increase in demands from partners?*	*Do your **stakeholders** have an adequate understanding of what you do? your suppliers?*	*Do you know what stakeholders consider to be **good practices?** Better practices?*	*How would you **respond** to an incident? i.e. crisis management?*
*How do you **evaluate** security and privacy risk?*	*How do you **coordinate** various security and privacy reviews?*	*Have you conducted an **awareness campaign** within the last two years to remind your people about their confidentiality obligations?*	?

Actualising Big Data – Are you prepared?

Do you have strategies, processes, technology and people in place to drive customer analytics and monetise customer insight?

Collect	✓
• Have you identified the high-value business levers that drive a positive customer experience?	
• Have you identified the corresponding information needs and which data sources (internal or external) are best suited to inform your customer strategy?	
• Have you identified which business problem could be effectively informed if you were to leverage real-time insights?	
• Do you have processes and technology in place to consolidate customer information into a single-view?	
• Are you harvesting and aggregating customer behaviour data and 'voice of the customer' data across social media, contact centres and other CRM sources?"	
Analyse	
• Are you getting appropriate answers to your business questions?	
• Are the KPIs in your dashboard tied to your commercial strategies and a positive customer experience?	
• Do you go beyond a promoter/detractor assessment and analyse what aspects of your product you customers like or dislike?	
• Are you harnessing off-shore capabilities where it makes sense to accelerate outcomes?	
Execute	
• Are you leveraging customer profiles to personalise the experience and provide meaningful up and cross-sell opportunities?	
• Do you match your customers' expectations with what you offer them and provide value in return for their time, endorsement and data?	
• Are you translating the findings into indicators and actionable insights?	
• Do you have a system in place that routs customer insights to the right touch-points in the organisation, to help them make pro-active decisions.	
Measure	
• Have you distinguished between metrics at the customer level and other data that needs to be lifted up to inform segmentation and profitability models as well as GTM strategy?	
• Are you harnessing the power of your product evangelists (quick wins)?	
• Are you systematically analysing the impact of your campaigns and build on successful programs?	
• Are you valuing your customers based on their spend only or are you also factoring in their social influence and advocacy value?	

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PwC contacts

In recognition of the dynamic approach required to succeed within today's digital economy, PwC's Digital services team is focused on providing highly strategic end-to-end consulting, that includes innovative thinking and identification of agile commercialisation opportunities. We will assess your business to help you make sense of both the drivers of disruption, as well as the levers that can be enhanced by digital change.

For a deeper conversation about making sense of digital change in Retail, contact Stuart Harker or John Riccio

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