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## Part III: Future Developments

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# 11 Big Data and Digital Marketing in the Sharing Economy

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### Introduction

'Big data' refers to datasets that are continuously generated from many sources and can be fully structured or completely unstructured (Sheng et al., 2017: 98). Big data is considered beneficial because its effective use can improve revenue management, enhance market research, improve customer experience, and help with reputation management (Yallop & Seraphin, 2020). This chapter contributes to an understanding of the opportunities and risks of big data use in digital marketing activity for sharing economy businesses. It provides information on the characteristics and processes of big data and maps its sources. It critically assesses how big data is used in digital marketing and aligns big data techniques to the marketing challenges facing sharing economy businesses. Then the chapter summarizes the core critical debates surrounding big data use and identifies the barriers to generating business value from a range of digital marketing techniques, before concluding with a discussion of the managerial and policy implications.

### Big data: characteristics and processes

The 5 V model Volume, Variety, Velocity, Veracity, and Value (Table 11.1) is an established way of conceptualizing big data (Lau et al., 2016). *Value* emphasizes the business value of big data, which because of third generation

of internet functionality, has increased (Web 3.0) (Baesens et al., 2016). Web 3.0 automates processes using artificial intelligence, and semantic web programming facilitates machine-based search and provision of content, which improves user experience. As a result, big data capabilities are an organizational resource comparable to financial and intellectual assets (Espinete, 2019). Big data provides several types of business value depending on the strategic goals behind its adoption and use (Inamdar et al., 2020).

Types of business value include:

- marketing value (e.g., by providing customized recommendations to customers based on big data),
- sales value (e.g., using the data to cross-sell products) and,
- economic value (e.g., by selling the big data to third parties).

**Table 11.1:** 5Vs of big data. .

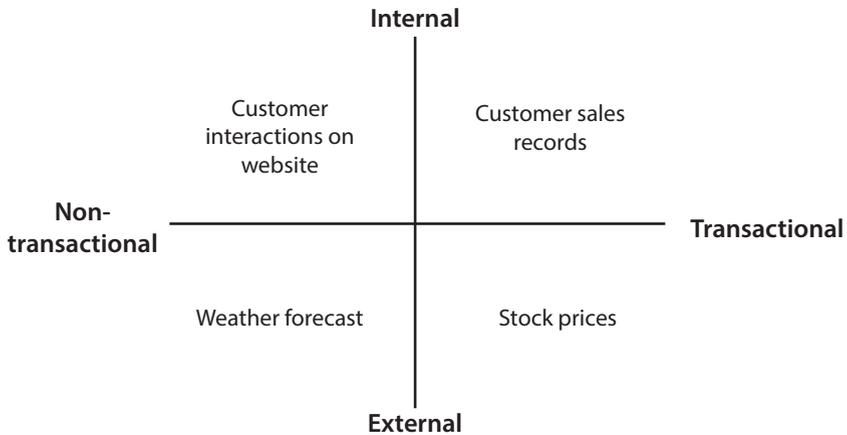
	<b>Definition</b>	<b>Implication</b>
<b>Volume</b>	Size of the dataset	Requires computing technology that has the capacity to store and retrieve data.
<b>Variety</b>	Difference in format, source, and structure of the data	Big data is a rich information source encompassing not only text but also audio and video from digital devices.
<b>Velocity</b>	Rate at which data is produced	Datasets grow rapidly due to numerous data-generating digital devices, e.g., mobile devices, sensor networks, and contactless payment. This means that technology must be scalable.
<b>Veracity</b>	Quality and validity of the data	Big data may contain omissions and errors which make it unsuitable for tasks where accuracy is critical, e.g. compiling accounts.
<b>Value</b>	Ratio of business value to data volume	Investment in technology and specialist skills means that businesses must ensure that value that can be extracted from big data.

Source: Adapted from Lau et al., (2016)

Stylos, Zwiendelaar, and Buhalis (2021) suggest that big data empowered agility for dynamic, volatile, and time-sensitive service industries. Big data enables the use of advanced predictive data analytics techniques when taking marketing decisions (Talon-Ballesterio et al., 2018). Generating marketing value depends on an understanding of big data sources and analytical techniques. Big data sources can be mapped along two axes: transactional or non-transactional, and internal or external (Figure 11.1). Transactional data occurs when a product or service is sold or purchased. Non-transactional data occurs after non-sales activity, such as customer online behaviour or sensor readings from interactions with smart devices. Internal data is owned and controlled by the organization. External data is beyond company control and is owned by other organizations or public services.

Big data analysis can provide marketers with actionable points or micro-moments of truth about millions of consumers (Braun & Eklund, 2019). There are three established big data analysis techniques. First, predictive analysis uses past observations to predict new observations and their associated outputs (Bradlow et al., 2017). For example, applying linear regression to sales data to predict future purchase or future profit. Second, causal analysis determines if A causes B and that B cannot be used to predict A (Rohlfing & Schneider, 2018), a commonly used form of causal analysis is A/B testing of online communication. For example, many variations of an online advertisements might be tested to see if there is an impact on sales. Third, correlation analysis classifies data according to the strength of the relationship between variables. Correlation analysis is used in customer profiling, which is also known as market segmentation.

**Figure 11.1:** Mapping the sources of big data.



Source: Adapted from Barham, 2017

Market segmentation is an established marketing technique, defined as the identification of customer groups according to shared characteristics and receptiveness to a particular brand and product category (Orenga-Roglá & Chalmeta, 2016). Sharing economy businesses can identify segments within their customer base, assess them against metrics such as sales or customer engagement and design a targeted marketing mix (Mody et al., 2019). For example, Guttentag et al., (2018) profile five user segments for the home sharing platform Airbnb: money savers, home seekers, collaborative consumers, pragmatic novelty seekers, and interactive novelty seekers. Big data capability enables sharing economy businesses to automatically target segments in real-time with a customized digital marketing mix by combining correlation analysis with predictive analysis and machine learning (Narayanan et al., 2017).

Despite big data analysis techniques involving specialist skills, data visualization provides business value by making the results accessible to non-specialists. Data visualization is the graphical representation of information and data (Billger et al., 2017) and uses software such as Tableau, Salesforce Einstein Analytics Platform, and Microsoft Power BI. The benefits of data visualization include (1) the flexibility to handle data and select variables to visualize; (2) the ability to have a full picture of a dataset and uncover hidden data properties; and (3) the easy extraction of charts and reports making results more easily accessible (Mahajan & Gokhale, 2017). The challenges of data visualization include (1) perceptual scalability, which relates to difficulty in understanding big data even when visually presented; (2) real-time scalability, which relates to the limited capacity of data visualization tools to process big data in real time; and (3) interactive scalability, which relates to challenge of manipulating big data.

## Big data in the sharing economy: digital marketing

The growth of the digital economy has boosted the growth of the sharing economy (Chen & Wang, 2019). A sharing economy involves the peer-to-peer sharing of access to unused goods and services (Sutherland & Jarrahi, 2018). Typical shared goods and services might be vehicles, accommodation, or household goods. The concept of a sharing economy is not new, as sharing goods between family and friends has always been common (Hossain, 2020). Sharing results in no transfer of ownership, is facilitated by digital platforms, depends upon a crowdsourced supply, and requires an expanded consumer role (Eckhardt et al., 2019). There are a range of benefits and disadvantages associated with the sharing economy (Buhalis et al., 2020).

**Table 11.2:** Alignment of big data techniques to peer-to-peer accommodation challenges.

Challenges	Detail	P2P accommodation	Big data techniques
Utility of sharing	Benefits that the sharing economy platform gives to its users.	How to promote the benefits of P2P accommodation platforms rather than alternatives?	Segmentation Programmatic advertising
Gaining trust	Ability to assess the quality of a product or service.	How to gain trust & reduce perceived risk when booking through P2P platforms?	Rating and review Sentiment analysis
User experience	Overall ease of using the sharing economy platform for providers and those borrowing.	How to facilitate transactions and improve the user experience?	Web 3.0 Personalization Recommender systems
Maximizing profit	Ability to increase rental income whilst minimizing use of the product or service	How can hosts maximize occupancy rates of their properties? And maximize price?	Recommender systems Pricing strategy

Source: Adapted from Key, 2017; Gibbs et al., 2018