

# Big Data and Entrepreneurship

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<p><b>Khan, M. Laeeq (2020). Big Data and Entrepreneurship. In L. M. Mahoney &amp; T. Tang (Eds.), Handbook of Media Management and Business (Volume 2, pp. 391-406). Rowman &amp; Littlefield. ISBN-13 : 978-1538115305</b></p>
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## **Learning Objectives:**

1. Understand big data analytics and the role of data scientists in media management.
2. Understand the importance of big data analytics for entrepreneurship.
3. Identify the opportunities and challenges brought by big data and analytics social in media management and business.

## **Introduction**

Having identified media management and convergence in a dynamic, globalized landscape of emerging technologies, we turn our attention to the future of media management practice and research. Big data is one of the most popular terms of our times that has gained considerable importance. The huge wave of digital transformation impacting individuals, societies, organizations and governments, has transformed how we live, work, interact, and entertain. The pervasive use of the Internet increases the importance of big data and makes a huge mark on the global economy. According to a Forbes article, worldwide big data analytics market is expected to grow to more than \$203 billion in 2020 (Press, 2017).

**Khan, M. Laeeq (2020). Big Data and Entrepreneurship.**

Big data not only impacts industry practice, but it is also changing the way media scholars engage research. In 2018, there were over 1 million academic peer review publications that utilize big data as a method. It is perhaps one of the most important technological changes in the past decade, as we now know more information about audience behavior than ever before.

The growth in the volume of data with the advancement of computing storage and processing power has heralded a new era where better connectivity between two-points further leads to an information explosion. The age of social media has propelled the rise of big data as individuals participate in the generation and dissemination of data at an unprecedented scale. There is no doubt that virtually every field of activity, from business to sports, to journalism to politics, has been transformed by data.

It is argued that big data as a field of study is interdisciplinary in nature comprising elements of mathematics, statistics, informatics, communication, and business. In fact, big data's reach and impact is so widespread that various other disciplines are also compelled into studying big data's role especially in the area of predictive analytics. Furthermore, artificial intelligence (AI), and machine learning are transforming various domains as they cater to the requirements of various forms of businesses such as healthcare, telecommunications, and financial services. All businesses, whether big or small, need to make effective decisions; and big data and analytics can help them make those decisions.

Not only are media industries increasingly dependent on social media for distribution of their content, the Internet has become a vital part of their overall strategy. The Internet and big data have led to the rise of newer realities whereby successful media companies rely on the data advantage to compete. While access to data and its efficient utilization is a desire of many in the industry, its effective deployment and utilization has only been successfully done by a select few who thrive on the data advantage. Netflix is a classic example of how a company used data to its advantage.

## Case Study

Netflix emerged as a disrupter in the film industry, debuting the opportunity for subscription-based mail-order DVDs. It was one of the first media platforms that recognized new media audiences weren't as interested in owning a media content library, as they were in gaining access to various titles at a reasonable rate. Additionally, Netflix users did not have to take time out of their day to drive to a rental store, like they did with Blockbuster movie stores. Instead, Netflix would automatically deliver to the doorstep of every user the next movie title in their queue. While today, they offer digital streaming, along with various other media conglomerates, including Amazon, Hulu, and Apple, their ability to utilize big data to reach fans is unmatched.

In addition to offering a more convenient and sought-after service to customers, Netflix proved itself as a savvy tech company when it began developing its own algorithms. These personalized, relevant recommendation systems pushed audiences away from larger blockbuster hits (titles with a large competition) and towards lesser-known library titles that were only available on Netflix (Richards & King, 2013). Thus, Netflix began introducing a new product to the previously bottle-necked film industry.

Netflix employs some of the smartest software engineers to develop algorithms to personalize their streaming service. Its recommendation development is based on a combination of machine learning, algorithms and creativity (Blattmann, 2018). According to Todd Yellin, Netflix's VP for Product Innovation, Netflix uses complex data to develop the algorithms they used, including "what people watch, what they watch after, what they watch before, what they watched a year ago, what they've watched recently and what time of day" (Blattmann, 2018, p. 2). While Netflix doesn't have access to more big data than other streaming giants, for example You Tube, some suggest that the reason they have been so successful is due to their ability to analyze the numbers in every new media production decision (Wu, 2015). This is perhaps one of the greatest takeaways of big data: It is only as useful as sense you are able to make from the numbers.

Today, Netflix serves over 137 million subscribers with over \$15 billion dollars in sales (Markman, 2019). Each of these users come with a wealth of data that producers can use to improve the user experience. This information guides almost every aspect of the streaming service, including future production, recommendation systems, and even cover art to the content users see. Big Data is reported to have saved Netflix \$1 billion a year in value from customer retention (Markman, 2019).

### **Something Old**

Any industry that deals with customers, employs machinery, uses content, moves things, and involves money are set to be transformed by big data (Davenport, 2014). In other words, marketing, supply chain, human resources, manufacturing, finance, and information technology, are all the types of business functions that already are, or will be impacted by big data. It is therefore evident that tapping into the potential of big data and leveraging the potential of analytics can significantly increase the productivity and the overall competitiveness of a business. When data is used as a strategic asset, real-time analysis can aid informed decision making. This may also lead to greater efficiencies that result from identifying and eliminating operating and production inefficiencies, and better customer experience. One of the biggest drivers of success in media companies using big data is a unique old-fashioned entrepreneurial mindset.

#### *Entrepreneurs and Data Analytics*

Entrepreneurs had historically relied on rudimentary observations, intuitions, and their gut feeling to make important judgements. Today, they are compelled to look into data and analytics to make informed decisions in a competitive world. Data analytics is concerned with sifting through vast amounts of structured and unstructured data to tell an effective story for better decision making. Determining patterns, trends, and finding hidden meanings from data is both an art and a science. This move towards data and analytics can also be attributed to the increased reliance on the Internet and online commerce. Each and every activity online result in the generation of vast amounts of data.

Generation of online data is only one part of the larger puzzle. To make better decisions, organizations need to process raw data into something more meaningful and understandable. Finding meaningful information is often challenging, like finding a needle in a haystack. Therefore, any data if not analyzed is useless. However, when analyzed, data can not only provide immense intelligence but also empower effective decisions that help media companies prosper and compete. From a practical standpoint, it isn't the size or volume of data that in itself serves as the advantage, rather it is what can be done with this data, the insights derived from this data, and the business value attained that matters. Companies such as Amazon, Netflix, Apple, Google, Baidu, Alibaba, all thrive on data and analytics. In fact, data and analytics is at the core of their business strategy and operations.

While big data proves an inherently new hot topic, it is consistent with the entrepreneurial mindset of many media industries that have risen before. Its position within media measurement is similar to other quantitative measurements we used in the past. Now let's explore the historic definition of big data and place it within the long historical trajectory of media research.

### *Defining Big Data*

In the media business fields, the use of the terms big data often generates awe and sometimes confusion about what it entails. This is mainly because big data primarily emerged in the computer science and informatics fields. Ancient civilizations also collected and analyzed information (later referred to as data). Today, data is essential to how new knowledge is created, and that "data provide the key inputs to systems that individuals, institutions, businesses, and the sciences employ in order to understand, explain, manage, regulate, and predict the world we live in and are used to create new innovations, products, and policies" (Thatcher, Eckert, & Shears, 2018, p.3).

It's important for media managers to understand that while big data is mostly unstructured; but once big data is tamed and processed, it can enable media companies to better understand audience behaviors, their likes and dislikes, their viewing and purchasing patterns, and possibly predict their future viewing and purchasing behaviors (Puschmann &

Burgess, 2014). Davenport (2014) defines big data as “a catchall term for data that doesn’t fit the usual containers” (p.1). Furthermore, big data tends to exist in a non-static manner, meaning that we can witness the constant, on-going and fast-flowing pouring of data from various sources, in particular social media, that makes the task of containing or storing big data in one place difficult. Therefore, to exploit and analyze big data, you need to develop or cultivate methods and techniques that can allow analysts to keep abreast of this continuously flowing nature of big data. Conventional and traditional analytics techniques do not work effectively in terms of analyzing big data. Media managers need to consider issues related to resource allocation when employing big data in their strategy development and decision making.

When it comes to the definition, big data can be understood as big and complex. However, just calling it big would not do justice to it. Data volume or size of data can be relative. What may be big for some may be relatively small for others. Big data was therefore described in terms of the three Vs: volume, velocity, and variety (Laney, 2001). Kaplan and Haenlein (2019) described big data to be “characterized by huge amounts (volume) of frequently updated data (velocity) in various formats, such as numeric, textual, or images/videos (variety)” (p.17). Although the three Vs, volume, velocity, and variety, do a decent job at explaining the complexities of big data, others have described big data through six Vs: volume, velocity, variety, veracity, value, and venality (Davenport, 2014). What matters most is that not only are media organizations getting a lot of data, they are also getting it fast, in complex formats, and from a variety of sources. Later in this chapter, we will talk about the emerging challenges brought by the veracity, value, and venality of big data to media managers in today’s convergent environment.

### *Big Data Analytics*

Big data and analytics are deeply linked to each other (Watson, 2014). Big data analytics can help media organizations develop new strategies and more effective tactics to conduct and improve business, and to exactly cater to what their audiences want and need. To

derive value from data, analytics techniques must be employed. Such analytics can include regression analysis, simulation, machine learning, visualization etc.

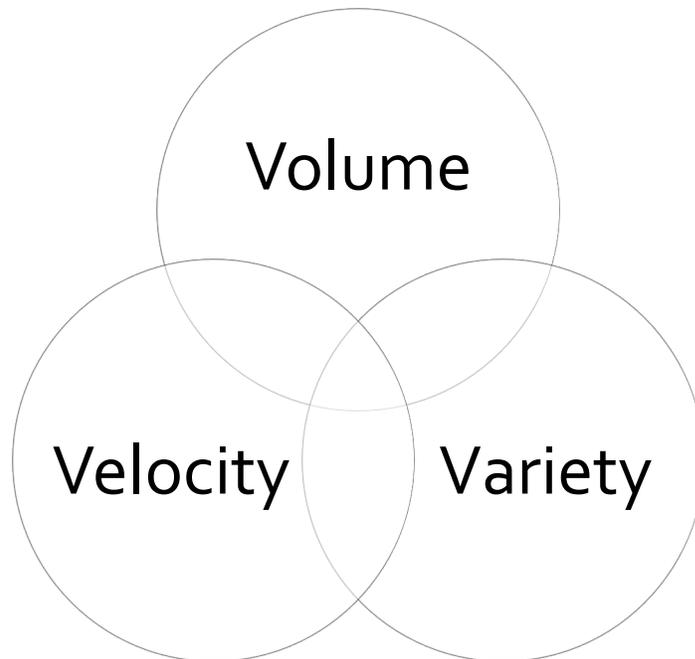


Figure 1: The 3 V's of Big Data

Analytics can be further broken down in three different areas: Descriptive analytics, predictive analytics, and prescriptive analytics. Descriptive analytics involves collection and processing of historical data to describe the past and current situation. Examples of descriptive data analytics can include facts and figures about sales, customer interactions, financial performance and other report about what happened, how and where it happened etc. (Davenport & Harris, 2017). Traditional ratings report from Nielsen is an example of descriptive analytics.

Predictive analytics is about predicting what can happen in future, and the emphasis is not on surface level observations but on predicting the next course of action. Examples of predictive analytics include statistical analyses, forecasting and predictive modeling informing about what will happen next (Davenport & Harris, 2017). The Netflix recommendation system

mentioned earlier in this chapter is a good example of predictive analytics. Netflix use predictive analytics to provide movie recommendations for their users based on their past viewing behaviors.

Prescriptive analytics helps suggest the best way to deal with a situation, and figure out the best approach forward for a specific circumstance. More like a doctor prescribing some course of action or the exact medicine to take (Davenport & Kim, 2013), prescriptive analytics often results in building advanced systems that automate the analytics processes. This is achieved through machine learning algorithms, experimental techniques, simulations, and various mathematical optimization measures that are leveraged to aid decision-making. In other words, prescriptive analytics comprises computational programs that select the best or optimal solution from several options, while also keeping in view the limitations in a certain situation. For example, building on the big data advantage, retailers are employing prescriptive analytics to receive specific instructions about what they need to do instead of managers reading complicated forecast reports (Woodie, 2016). Retailers can learn about the price that would give them the highest level of profitability. Logistics companies such as UPS can provide specific instructions (based on analytics) about how, what, and where to drive in order to deliver packages in the most efficient manner (Davenport, 2014).

Media organizations can use prescriptive analytics to prescribe through experimental design and optimization techniques (Davenport & Harris, 2017). For example, prescriptive analytics can be employed by a media company to determine the best social engagement opportunity. Social media managers can use optimization tools to know exactly how much money to spend on advertising across social media platforms. Depending on the overall business goals, media companies can learn about the specific allocation of time and human resources to deal with customer queries and create targeted content on social platforms (Hausman, 2013).

Hopefully, now you have understood that data can be of various types. Media organizations can gather web data such as page views, time spent on a site, customer searches etc. They can also capture data from social platforms such as Facebook, Twitter, blogs, etc.

These data could be in the form of text, images, or videos. Data can also about the location of individuals, known through addresses, GPS, and IP addresses. All forms of data will be used in a combination strategically for managers to make decisions in today's convergent environment.

### *Training*

Big data help point to overall trends in audience behavior. Data scientists are able to watch patterns of media consumption and use this information to help predict what will be popular in the future. However, big data can't help producers answer every question that they have from an audience. Most importantly, content managers will need to be trained in additional hybrid methodologies to help understanding *why* audiences may be behaving in certain patterns. Like most research methodologies, big data works best when triangulated with other methodologies, particularly qualitative research methods. However, it does invite a new type of researcher to mass communication: the Data Scientist.

### **Something New**

Industries across the globe are facing increasing competition and uncertainty as technological advances open new avenues of growth. Media and entertainment industries in particular are in a state of flux as converging technologies present newer challenges. As media consumers have greater choices and power to get content from various sources, media companies are faced with the challenge of making the most of the razor-thin profits. This often involves using harnessing the potential of big data with a better understanding of what data can do for them. The creation of ever more advanced and newer job roles in the form of data scientists, analysts, and machine learning experts demands an investment in such resources, both human and technological.

Capitalizing on the promise of predictive and prescriptive analytics, media companies can better target their advertising dollars, optimize creation and scheduling of media content, find new markets and revenue sources, and get better content recommendations that prevent

churn. However, to achieve the benefits of big data, media companies need skilled experts who can implement such predictive and prescriptive techniques.

### *The Role of Data Scientists*

People who conduct big data analytics are referred to as “data scientists”. In an article published by *Harvard Business Review* in October 2012, titled “Data Scientist: The Sexiest Job of the 21<sup>st</sup> Century”, Thomas Davenport and D. J. Patil pointed towards the importance of data scientists in finding treasure out of “messy, unstructured data”, and that there is a shortage of such people. This holds true even today, as we notice a high demand of skilled data scientists who can make sense of big data through sophisticated analytics techniques. It is also important to note that our field needs media managers who can work with data scientists and use their analytics to help make strategic business decisions. How to balance data and creativity will be a major challenge faced by all media managers in today’s convergent environment.

Data scientists are viewed as the dominant contributors to the emergent field of big data. In particular, these data scientists are believed to possess the skills necessary to utilize and sort out data. According to Davenport (2014), “[Data scientists] extract the data from obscure locations, write programs to turn unstructured into structured data, analyze the data, interpret the results, and advise executives on what to do about it—all in short order and with a sense of urgency” (p. 110).

Capturing big data, as Davenport (2014) argues, can be done much easily with software and applications. However, it is the task of processing data and structuring data that tends to require expertise from data scientists. While it is impossible to deny the significant role of data scientists, to exploit big data means an effort to collaborate among stakeholders (e.g., media managers, marketers) and other individuals in order to make sound decisions (Davenport, 2014). A successful business requires teamwork, and a business that capitalizes on big data is not exempt from this axiom.

Davenport (2014) explicitly argues for a need to “combine data science activities with traditional data management virtues” (p. 137). Within this context, big data clearly operate in ways that solicit innovation, and collaboration, and encourage both startups and large media corporations to stay on top of their games if they hope to survive, thrive, and prosper within today’s convergent environments. Furthermore, to be successful and to act upon new opportunities provided by big data, adaptation and more effective ways of management are to be considered.

### *Importance of Big Data Analytics for Entrepreneurship*

It is vital to understand the link between big data analytics and entrepreneurship. Churchill (1992) defined entrepreneurship as “the process of uncovering and developing an opportunity to create value through innovation and seizing that opportunity without regard to either resources (human and capital) or the location of the entrepreneur – in a new or existing company” (p.586). From another viewpoint, Peter Drucker (1970) viewed entrepreneurship as something related to taking risks, creating something new – new value, new products/services, new organization or business, new wealth etc. In the information age, the traditional concept of entrepreneurship takes the meaning of new innovation, a commitment to change and adaptation in the face of new realities of big data. Entrepreneurs and media managers need to be ready and prepared to collect data, process and analyze it, and visualize it to tell a compelling story that helps them make better decisions.

For many entrepreneurs who are not utilizing big data, there is a need to recognize the potentials of utilizing big data in the media industry. Big data have gradually changed the way media companies operate and have provided them with invaluable and overarching opportunities to improve their products and services. The modern entrepreneurial mindset ought to embrace and utilize big data resources. A large part of the success of Amazon, Google, Facebook, and Netflix can be attributed to their approach towards data and analytics, and how they steer themselves based on data advantage. Therefore, effective and strategic use of big data can provide a media company with a competitive edge.

Today, entrepreneurship stands at a crossroad. Analytical approaches need to be at the heart of management, requiring constant change, learning, and acquisition of essential skills that are relevant in the data analytics landscape (Sedkaoui, 2018). In other words, there needs to be a realization amongst media organizations that the latest technological challenges can be best met by situating and creating timely and insightful responses. Such responses can be in the form of effective analytics-focused business strategies and plans that can allow such companies to compete in an intensely competitive media environment. Capitalizing on the potentials of big data can further foster predictions regarding business trends. In particular, media organizations that do not understand the impact of big data on contemporary business world are likely to lag behind (Davenport, 2014). Each media market holds unique opportunities for utilize big data.

### *Music*

Similar to most big media revolutions, music was at the forefront of the big data trend. Streaming platforms such as *Pandora* and *Spotify* created algorithms to use an audience's preferences and settings to suggest new music. Even the downloading pioneer Napster included personal recommendation filters. Today, *SoundCloud*, *Apple Music*, and *YouTube* following have become leaders in utilizing big data. Music production has also heavily relied on big data to make decisions, though with much less confidence. Today, music producers are choosing new artists based on their following and engagement on these streaming platforms. Big data helps to offset risks by offering deals to artists with a steady following. Using big data to track new artists is a double-edge sword. On the one hand, users are able to use recommendation systems to discover music that they may otherwise never hear of. On the other hand, recommendation systems are inherently tied to a popularity bias. It can be increasingly difficult for new and niche artists to break through. Artists that are the savviest with their social media promotion will gain the most traction in this system.

Individuals feel strongly about their music collection, and while they may not necessarily own these digital formats, they do rely on big data to keep the music familiar, as well as fresh and interesting. Digital media must be presented at a low-cost through

subscription services or tiered system of payments. It is important to note that consumers are becoming more critical about how music services utilize their personal data. As most music platforms steadily rely on revenue support, many have used big data to profile and track individuals and then sell their personal information to external parties (Heitner, 2019). Privacy and data security become an emerging issue in the music industry, a topic that will be addressed in greater detail later in this chapter.

### *Film*

Unlike music, film has been slow to adapt to changes and opportunities brought by big data. Hollywood has historically shied away from risk-taking by offering products for microsegments of the population. For the most part, big data hasn't done much to change this on the big screen. As discussed in the case study above, big data has allowed alternative paths for content distribution to video on demand streaming services, such as Netflix, Hulu, and Amazon. Netflix is able to use big data to predict what you want to watch next in your queue, and what you will want to see in the future. Their ability to use big data to inform Netflix-produced programming is one of the most effective uses of big data in media management.

That's not to say that studios in Hollywood are not using big data in their metrics. Interestingly, Smith (2018) reports studios are now adding a post-production process where audiences are asked to complete real-time opinion assessments after a movie has been shown. Results from these data help inform final decisions, such as targeting specific demographics in marketing campaigns, developing appealing trailers, and pushing distribution to specific geographic areas. Playing to the crowd is not a new concept in film, but big data can provide a higher level of confidence in their judgements (Smith, 2018). Nonetheless, it can create the same self-fulfilling prophecy where the same types of producers are being reproduced over and over, as audiences don't always know what they like until they have been exposed to something new.

## *Social Media*

Social media analytics have gradually brought changes to the media industries. Journalists are being encouraged to engage audiences through social media platforms, and preferential treatment is given to those who are able to garnish the most “likes” for their posts. Perhaps no industry is as influenced by big data as marketing and advertising. While focus group and survey research have proven difficult and expensive for media practitioners to conduct in the past, social media provide more in-depth information to media managers today with virtually no effort on the end of the media practitioners. For example, Facebook has a free, powerful analytics tool, *Facebook Insights*. Facebook Insights is easily accessed through any business page, and can track page likes, views, reach, audience demographics and more. It has even begun providing information on its sister platform, Instagram.

On the other hand, Twitter has taken a different approach to data management. Twitter is interested in the data licensing business, acquiring over \$70 million in licensing payments in 2013 (Edwards, 2014). While some data is free and accessible for users, depending on the size and relevance of key word searchers, Twitter will charge to track hashtags or archives of the site.

These are many new ways in which various media utilize and adapt to big data. While big data provide many new opportunities for media managers, it is not without challenges. Let’s explore what are the opportunities and challenges media managers would encounter when developing business strategies for their needs.

### **Opportunities and Challenges**

Advances in data capture, storage, and processing creates notable hype around analytics and what it can do. Those businesses and organizations who have employed big data analytics have already reaped immense benefits. Benefits in the form of cost reductions and improved efficiencies are providing a competitive edge in global business environment. However, we also witness challenges in the form of data privacy, security, and rampant online misinformation. These factors will be discussed in greater detail below.

## *Opportunities*

Data analytics is a “value generator for entrepreneurial opportunities” (Sedkaoui, 2018, p.1). However, for such value to be generated, media organizations must have clear objectives. Big data has the potential to bring immense cost reductions, significant improvements in computing tasks efficiencies, online user behavioral predictions, enhancing engagement, etc. Among these, media managers should give attention to three major opportunities brought by big data and analytics: (1) understanding and connecting with audiences, (2) predicting audience behavior, and (3) exploring trends and improving efficiency.

### *Understanding and Connecting with Audiences*

Big data helps media organizations understand their audiences better. Through market research and analytics, organizations can understand how their audiences behave online (and offline). By understanding audience interactions, they can better plan their marketing strategies and engage with their audiences more effectively. Large datasets can be mined for critical and timely information that can enable informed decision making. Historical data about audience interactions and customer transactions can also inform media companies when developing their business strategies. Studying audiences or customers for factors that drive their behavior helps media organizations make better decisions. Once it is understood who and where the audiences are, the next logical step is to connect with them. Connecting with audiences and better engaging with them allows for more targeted advertising. We have discussed how to connect with audiences/consumers in details in Chapter 8 Marketing in this book.

### *Predicting Behavior*

Data analytics can help media managers predict audience behavior and plan accordingly. Planning ahead for customer needs can be crucial in a competitive world. Recommendation systems also help companies “think ahead” and thereby target customers by predicting their needs. By studying customer transaction data, for example, companies can predict what they would be most interested in next. This will be the difference between a

successful company that relies on data and analytics to compete versus an organization that does not fully utilize its data potential.

### *Exploring trends and improving efficiency*

Effective data analytics can help media managers better manage costs and operations. By having immediate answers to critical questions, decisions can be made in a timely manner. Instead of sifting through a myriad of records of raw data, insights gained through analytics can aid efficient and effective decision making. Important trends can be identified accordingly. There are a number of prominent examples where big data analytics has helped organizations perform better. At a general level, supermarkets and pharmacies have loyalty cards for their customers, through which stores can track purchasing habits and sift through their data for customized store offerings (Thatcher, Shears, & Eckert, 2018).

Since time is of essence, the time required to carry out day to day operation within a company is being shortened with the help of data analytics. A case in point is a U.S. based department store Macy's merchandize pricing optimization system. The system has reduced price calculation from twenty-seven hours to just one hour (Davenport, 2014). Such time savings and increased efficiencies brought by data analytics has enabled Macy's to compete effectively through improved and timely marketing and overall cost reductions.

When Starbucks introduced a new coffee, it was naturally concerned customer responses; data and analytics based on social media reactions to the new coffee informs the Starbucks management team that although customers liked the taste of the new coffee, they were not happy with the high price (Watson, 2014). Similarly, based on data and analytics, Target predicted whether some of its female shoppers were pregnant and sent them store coupons related to pregnancy related items (Duhigg, 2012).

As discussed in the case study, the success of Netflix serves as one of the most compelling examples of big data analytics success. Netflix rose to prominence as a global online content creation and distribution company having presence in more than 190 countries, with revenues in excess of 8 billion US dollars in 2016 (Davenport & Harris, 2017). Netflix is

known for successfully harnessing the power of data through effective analytics whereby it understands customer behavior and buying patterns and turns this knowledge into a competitive advantage by offering movie-recommendations and personalization for each customer (Davenport & Harris, 2017).

### *Challenges*

While big data and analytics brought many opportunities to media managers, media organizations also need to address the various data related challenges. Below, we will discuss three major data analytics challenges faced by the media industry: (1) privacy and security, (2) misinformation and fake news, and (3) extracting data value.

#### *Privacy and Security*

With the rapid rise of data volume and variety, issues of privacy and security are also bound to increase. As mentioned above, privacy is one the of the most important issues faced by our information-dependent societies today. How much data should governments and media organizations have access to? How will private user data be used by media companies and advertisers? Are there effective safeguards in place to protect user data from misuse and unauthorized use? The above-mentioned example of Target superstore in using personal data to predict pregnancy related targeted advertising is a case in point where personal privacy seemed to have been compromised, bringing into question the ethical norms.

It is observed that our citizens have not had sufficient understanding or given enough attention to how their data is being used by organizations. This points towards a general lack of understanding and awareness about the costs associated with the rise in data analytics especially in the realm of social media.

#### *Misinformation and Fake News*

Fake news has existed in the information ecosystem of various societies in a form of a rumor, gossip, and propaganda (Burkhardt, 2017). The advent of big data has complicated the situation because the rapid flow of information and its sheer volume makes it hard to

differentiate credible information from false data. Technological advancement, pervasive use of social media, and clickbait advertisement are some of the factors that exacerbate the flow of misinformation and fake news. Organizations need to ensure that data does not include fake information otherwise good value cannot be derived from it.

Dealing with widespread misinformation on social media requires a thorough evaluation of the information gained, as well as new approaches and strategies. Such strategies include more individualized analytics and system-based algorithms. Information verification strategies by individuals require Internet skills such as knowing how to search for information, share information, and verify it.

### *Extracting data value*

A challenge of big data is the lack of structure. Most of big data especially those emanating from social media lacks structure. In other words, data first has to be brought in rows and columns to make sense of it. Extracting value from data can be hard, and much of the challenge is because of a lack of understanding at the managerial level about the potential value that can be derived through big data analytics (Morabito, 2015). From a technological perspective, a lack of consistency of analytical and database systems internally and externally adds to the level of complexity and inhibits the extraction of value from the available data streams (Sedkaoui, 2018).

The above-mentioned factors about extracting data value can also be viewed from the lens of complacency on the part of managers who are responsible for implementing a big data analytics strategy (Davenport & Harris, 2017). History is filled with examples of how complacency or a lack of understanding and timely vision led to failure. Photographic film companies were not able to fully comprehend the threat from digital photography, just as movie rental companies like Blockbuster were not able to foresee the rise of digital streaming companies like Netflix (Davenport & Harris, 2017).

While privacy concerns, misinformation, and an inability to extract data value are huge challenges to future practitioners, each of these should improve as scholars, managers, and

citizens become increasingly savvy. Big data is still relatively new. It is refreshing to see media literacy courses and basic online courses being implemented into k-12 education. While it is always challenging to ensure the quality and value of data, big data have made personalization, customization, and user-generated content the norm. The more practitioners are able to cater to these features, the more connected and engaged they will be to their audiences. Media managers should use the following Action Plan as a guide as they develop a big data strategy.

**Action Plan:**

1. Hire and train skilled data scientists who understand the company goals.
2. Never break audience trust for the sake of obtaining data. Be transparent about how you are going to use data and user information to increase revenue. Protect the privacy and security of your audience.
3. Use big data during almost every media production and post-production process.
4. Remember to also rely on qualitative and hybrid methodologies to better understand why your audience may be behaving in certain ways.

**Key Takeaways:**

1. Big data is best characterized by a huge volume of frequently updated data in various formats, including numeric, textual, and images/videos.
2. The application of big data has proven a major disruptor in today's media marketplace, especially in the music, film, and advertising industries.
3. Media managers are able to use big data to better understand audience behavior and better connect them to their product.
4. Many key challenges still exist in big data, including extracting value data, the rapid spread of misinformation, and privacy/security concerns of audiences.

## Conclusion

Data and analytics lie at the heart of the digital revolution. Capitalizing on data and leveraging the power of analytics for entrepreneurship and various other hinges on a carefully planned and sustained effort. Big data is already an integral element of the overall business strategy for many media organizations, and it is expected to become even more important for managers and various types and size of business in an increasingly competitive and convergent environment. It is believed that by the end of 2020, the big data volume is expected to surpass 44 trillion gigabytes or 44 zettabytes (EMC, 2014). This indicates a major challenge in terms of data volume and complexity, but also an opportunity that needs to be seized.

Here we can unequivocally see time and speed as the two integral components of big data. In order to turn big data into something useful for media businesses, analytics must be carried out swiftly so that these data can be efficaciously categorized and structured. Media organizations that do not try to stay on top of their analysis of these data might occupy a disadvantaged position. Davenport (2014) highlights the possibility of big data to introduce media organizations with more information and materials about how customers react and behave toward certain products, therefore leading to the proliferation of advertisements, products, services that are customized and created for particular segments of these customers.

While technology allows media organizations to gather more data, more attention should be paid toward how entrepreneurs adapt to a big-data environment and how they make sense of and structure big data. Such a change that embraces the big data analytics requires "considerable imagination, courage, and commitment" as essential entrepreneurial characteristics (Davenport, 2014). Within this context, one can understand the interplay of various and disparate factors that can work together to make the best out of big data. What make big data appear appealing to businesses, corporations, and organizations stems from the notion that big data can reduce cost as well as contribute to the development of new ways to improve data gathering and collection.

While many companies have embraced big data and analytics as part of their strategic mix, a large number still lag behind in full utilization of the data advantage. It is clear that big

data analytics enables informed decision making. What is required is the realization of the importance to cultivate a culture that values data. The advent of cloud-based computing has lowered the barriers to the adoption of big data analytics. This has certainly opened up more opportunities especially for small and medium-sized entrepreneurial ventures as they too can embrace analytics technologies to their advantage.

It is worth remembering that in the globally competitive world only the smartest would survive. Being smart implies that companies and organizations are agile, embrace changes, and inculcate newer solutions that help them make informed decisions in a timely manner. Since data is being constantly generated, opportunities also continually expand.

Media scholars are beginning to incorporate big data into their own academic research. Results are being met with a combination of enthusiasm and skepticism. On one end of the spectrum, it is finally possible for the average researcher to deal with data sets that are affordable and include a representative sample. On the other end, new waves of research illustrates that data size really doesn't matter at all (Davenport, 2014). Instead, it matters much more what you do in your analysis. Academics must be careful not to rely solely on big data, especially those generated on social media. It must be carefully considered which populations are included and excluded from these measurements. However, as more Ph.D. programs train future data scientists in big data measurements, the results should only improve.

Big data has proven itself as one of the biggest drivers of success in today's convergent environment. Like most things, we must be cautious that just because something is new, it does that mean that it is better. The next chapter will explore the best way to merge "new" concepts and trends in media management with more traditional "old" foundations.

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