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Big data: The effect of analytics on marketing and business

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Abstract

Big data analytics takes raw, real-time data and uses it to predict trends. Successful use of this data can have a powerful impact on a business's effectiveness and ultimately their bottom line. As the amount of data increases, the need for analytics is growing. This teaching study discusses the role of social media in data analytics, how to approach the subject, and the desired outcomes. Students will explore the expansion of this field of study, familiarize themselves with the concept and where they may have encountered it in their lives so far, and discuss what analytics can contribute to running a successful business.

Keywords

Analytics, digital technology, business operations, big data, social media analytics, predictive analytics

Introduction

The magic of analytics seems mysterious and complicated to many people, although most are somewhat familiar with it, as they comment on how their Google search history has been ruined by a weird keyword or how smartphone and home devices seem to have the ability to read minds by providing ads on Facebook for the very thing they were planning to buy. Those who have built their own websites may also have some understanding of key words and the importance of search engine optimization in driving users to their sites. Cookies must be enabled on websites in order for them to function optimally, which allows data to be stored and distributed online, and with each new phone upgrade there are features to track frequently visited places and share information across app platforms for "targeted ads" that promise a "better user experience." The question is, once all this data is compiled, how can it be used to benefit businesses?

The following study of information surrounding analytics and the importance of data, not only in social media, but for business operations and marketing, looks into what analytics is and what it can do, its place in the future of business planning, and problems that arise with its use.

Types of analytics

There are many forms that analytics can take, and the amount of data and the outcomes can be customized to meet the needs of individual businesses and even departments within that business. Couldry et al., (2016) divide analytics into the following categories:

- Basic analytics, which include automated tools within digital platforms including websites and apps.
- Adjustments made by companies to incorporate basic analytics in daily practice.
- Designing digital platforms to interact with users through front-end design.

Sivarajah et al. (2020) point out that analytics can be used to "support business to business sustainability" and are essentially "another method to gain information from the crowd as another avenue to traditional methods." This implies that businesses should take advantage of all the data at their fingertips, which requires knowledge of how to apply the raw information in a way that has benefit.

> Social media big data analytical techniques can be used to help organisations gain both holistic and personalised insights into the current situation in real time, thus allowing managers to take the most appropriate course of action, when required. Organisations need to be equipped with appropriate tools and skills

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> to analyse and make sense of the data. The data derived from social media platforms provides organisations with detailed insights into consumer opinions and views relating to their brands and products, thus allowing the organisations to adapt and tailor decisions accordingly. (Ibid.)

Third party data analysis allows a business to make informed decisions that improve the business with value-added services by offering insights and identifying patterns (Ram Mohan Rao et al., 2018). An example of this "prediction, forecasting, and recommendation" is when a site can suggest additional products to customers due to their buying habits (Ibid). As an example, they site "Facebook does suggests friends, places to visit, and even movie recommendation based on our interest" (Ibid). Amazon will show shoppers what other people have bought at the same time as a particular purchase as well as similar products and allow comparisons, always making sure to include their basics brand an as option. Relevant ads can be targeted to the user with the use of cookies. Analytics can also be used in business to business interactions. Understanding how to apply real-time data leads to differentiation and competitive advantage (Bowen et al., 2020).

Analytics in social media

Social medial analytics can be used not only to increase traffic within the realm of social media but also to cull data from users that can be extrapolated to predict market trends and consumer patterns, and anticipate the future wants and needs of targeted customer groups. "The Internet has experienced a constant growth and development, both in the past and nowadays, creating digital traces that can be collected and processed to define different individual schemes, themselves useful to discern both single- and group-related behaviors" (Ducange et al., 2018). People do not realize the vast implications of their interactions online and what it reveals not only about their own preferences but their place in society as a whole and the way that businesses can use mundane, everyday internet use as a predictor of marketing success. "The availability of data resulting from social media consumption provides organizations with the ability to execute, timely, actionable, meaningful business decisions" (Sivarajah et al., 2020).

Social media analytics can also be used for business to business research. Meire et al. (2017) compiled "purchased commercial data from a specialized vendor, data from the prospects' web pages and data from the prospects' Facebook pages" in order to generate potential client lists. They explain their process and outcome: "Data collection started with the commercial data, as this was available for all prospects and customers, and we took a random subsample of 92,900 instances. Next, we looked for the websites of these companies, which resulted in 65,391 records with available websites. Finally, we identified the Facebook pages and end up with 26,622 companies for which all data were available. This dataset consisted of 17,536 existing customers and 9086 prospects" (Ibid). Domo has an infographic title "Date Never Sleeps" that they update yearly to show the amount of information generated in 1 day online. The numbers are staggering.

For example, in *1 minute*, the following things happen:

- Instagram users post 347,222 stories
- YouTube users upload 500 h of video
- Twitter gains 319 new users
- Consumers spend $1,000,000 online
- Microsoft teams connect 52,083 users
- Facebook users share 150,000 messages
- LinkedIn users apply for 69,444 jobs
- TikTok is installed 2704 times
- Venmo users send $239,196 worth of payments
- Spotify adds 28 tracks to its music library
- Instagram business profile ads see 138,889 clicks
- Amazon ships 6659 packages
- 1,388,889 people make video/voice calls
- $3805 is spent on mobile apps
- WhatsApp users share 41,667,667 messages
- Facebook users upload 147,000 photos
- Zoom hosts 208,333 participants in meetings
- Reddit sees 479,452 people engage with content
- Netflix users stream 404,444 h of video
- DoorDash diners order 555 meals

Larger social media platforms like Facebook often sort online data using algorithms, with limited manual adjustment, in order to extrapolate data such as user statistics. "A social analytics approach—more precisely, a sociological treatment of how analytics get used by a range of social actors in order to meet their social ends—aims to capture how particular actors reflect upon, and adjust, their online presence and the actions that feed into it, through the use of 'analytics'" (Couldry et al. 2016). Analytics of how users interact can help increase website engagement. Couldry et al., (2016) explore how C-Media analyzed exchanges via Facebook or email and social connections such as "likes" to encourage further engagement with the comments functions and introducing new ways to interact, with Five Star and Community Tag options. The benefits are twofold, in boosting engagement, and providing more user information for further analysis.

Social media analytics has the ability separate spam profiles from unique users and determine which responses are genuine and which are generated by bots to ensure that resulting data is relevant. Aswani et al., (2018) used metrics such as "emotion diversity, polarity diversity, hashtag frequency, unique words, user @mentions, lexical diversity, added to lists, user reputation, following rate, tweet, follower,

favorite and friends count" to analyze 18,44,701 tweets from 14,235 Twitter users with bio-inspired computing algorithms to classify them into spammers and non-spammers.

Having this skill set will be sought after in the job market. Batrinca and Treleaven (2015) explain, "Analyzing social media, in particular Twitter feeds for sentiment analysis, has become a major research and business activity due to the availability of web-based application programming interfaces (APIs) provided by Twitter, Facebook, and News services. This has led to an "explosion" of data services, software tools for scraping, and analysis and social media analytics platforms. It is also a research area undergoing rapid change and evolution due to commercial pressures and the potential for using social media data for computational (social science) research." There is a demand for those who can make sense of all this raw data in relevant ways (Figures 1 and 2).

Big data analytics

Outside of the obvious data generated by social media and smartphones, digital technology used by "hospitals, banks, e-commerce, retail and supply chain" and machines such as "closed circuit television streaming, website logs, etc." (Ram Mohan Rao et al., 2018) are a rich mine of information. According to Bowen et al. (2020) business analytics have a strong role to play in strategic planning.

- Big data analytics enable organization strategy alignment, ensuring IT works with the business strategy.
- They contribute to competitive advantage by allowing development of innovative services.
- They improve customer experiencing by providing better products and services by establishing relationships with other complementary businesses.
- They facilitate rapid response to change.
- They improve differentiation strategy and organization design.

This may seem like too much to hope, but the numbers speak for themselves and information is power. Akter et al. (2020) "define service analytics as to the delivery of insights by leveraging big data analytics for service systems and enable strategic and operational decision-making to continuously enhance customer interactivity at every touchpoint and deliver superior customer experience." Bowen et al. (2020) explain "The deployment of big data analytics capability enhances decision-making by enabling the right decisions to be made at the right time, improving risk management, determining and identifying market segmentation, such as niche markets, monitoring product development, detecting and identifying fraud and making production processes more efficient."

Akter et al. (2020) put it like this: Big data analytics "harness insights to deliver, serve, and enhance the customer experience in the digital marketplace." The example they use is Google being able to trace a user from their search to any ultimate purchase made in person as a result. Data-driven service symptoms include "smart service, mobile service, cloud service, or … technology-mediated service" (ibid.) which essentially allows them to follow a customer from their home into the world, essentially mapping their progress at each stop. "The consumer purchase journey now than ever is hugely getting influenced by the various digital touchpoints. Consumers are switching between various online platforms before making a purchase decision. For business, the challenge is how to show up at all of these moments" (Kaila, 2020). A person's social network can be "used to gain an understanding of a group of people by mapping the relationships that link them as a network" (Sivarajah et al., 2020). "Consumer needs and behaviors change rapidly as they are exposed to information anywhere, at any time; the constant inflow of news about your friends' lives, politics, global affairs, and the general overload of media create distractions day in and day out" (Kaila, 2020). "Social network analysis uses a social network graph to map and measure relationships between people, groups, organizations, from social media using network theory of nodes and connections" (Sivarajah et al., 2020).

To continue the map analogy, Smith (2020) explores the use of location data and its ability to invest "specific meanings into the social relationship between people and places." He explains that "geodemographic clustering…allows for the classification of populations through postal codes" (Ibid). The ability to pinpoint user location has existed for at least a decade and allows a business to determine overlap in the location of the group they want to reach with advertisement and where that group exists in key high traffic areas. "Advertising placement strategies in the urban environment are increasingly becoming enmeshed with measurable digital behaviors that create a feedback mechanism for location analytics and the classification of relevant people, places and media" (Ibid.). He uses the phrase "*You are where you go"* to show how designing urban space to include optimized retail placement and ad strategies can multiply their effectiveness. This extends to virtual real estate as well, Decarolis et al. (2020) explain, "The transition of the advertising market from traditional media to the internet has induced a proliferation of marketing agencies specialized in bidding in the auctions that are used to sell ad space on the web." Smart advertising, smart business, and smart development are all natural results of the current use of analytics.

Analytics: the wave of the future

There are financial benefits for a company to use and integrate date from social media. Ducange et al. (2018) state, "Mining and analyzing the valuable knowledge hidden

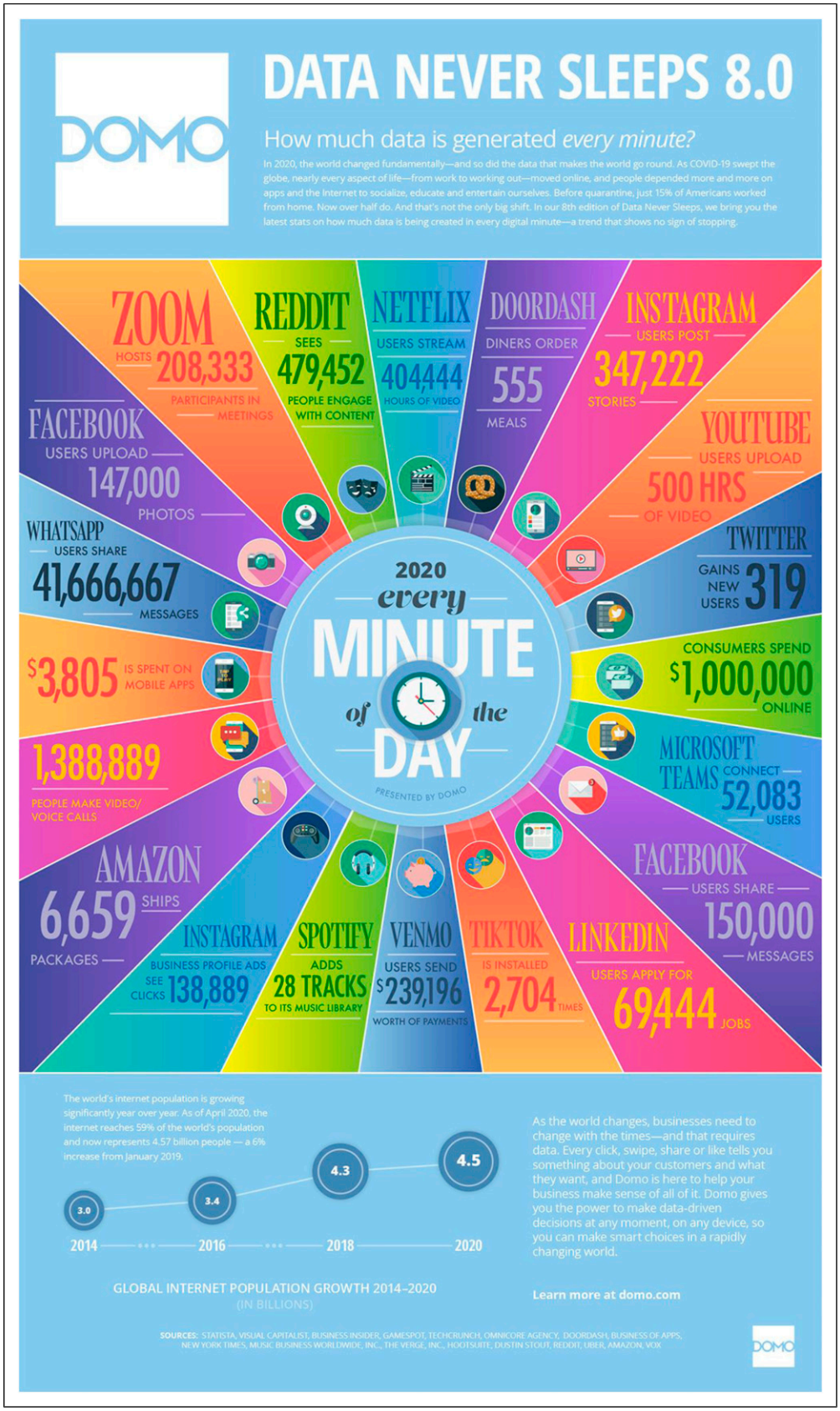

Figure 1. Data never sleeps.

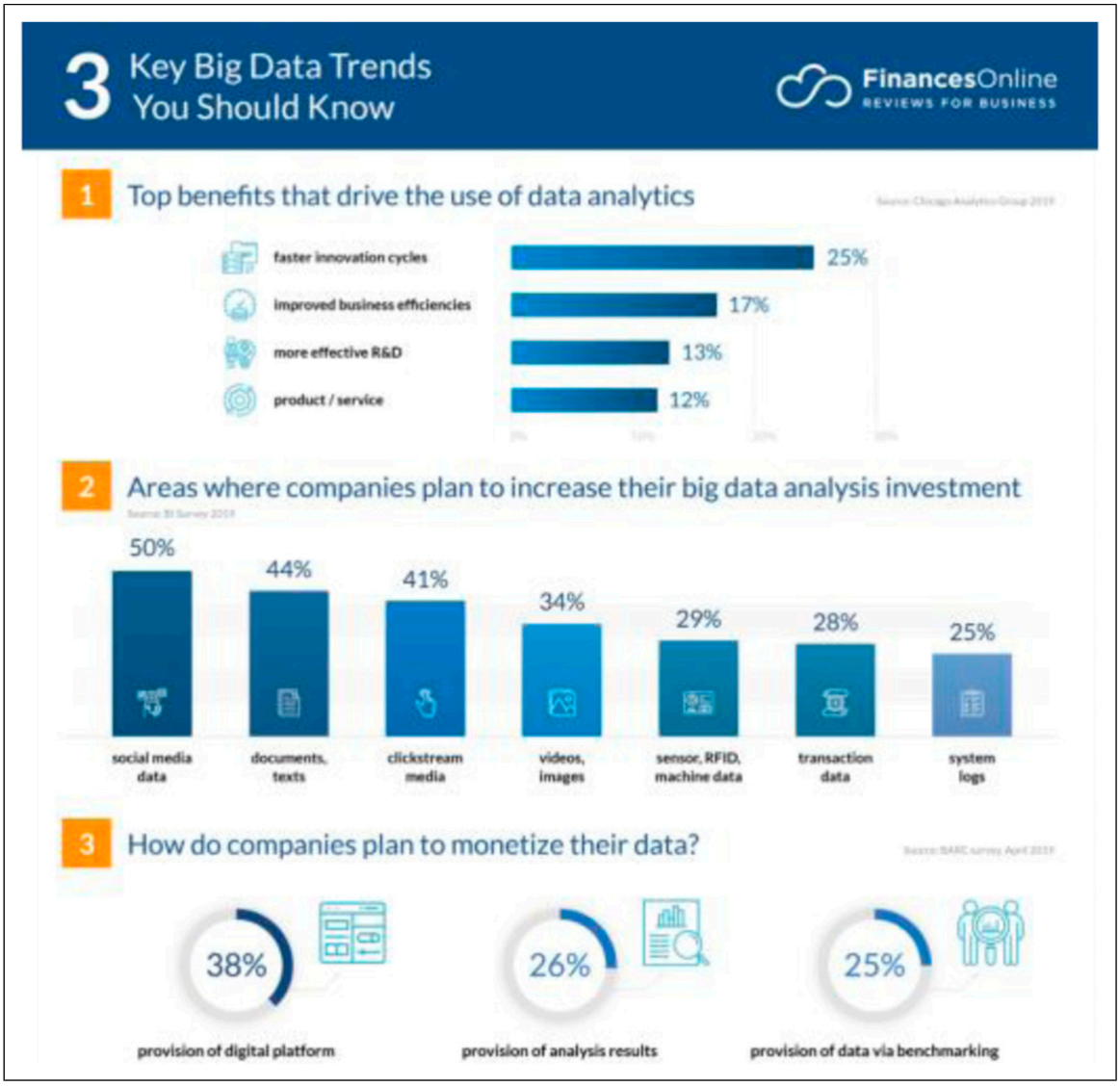

Figure 2. The growth of analytics.

behind the amount of data available in social media is becoming a fundamental prerequisite for any effective and successful strategic marketing campaign." However, though "big data can be definitely considered a blessing for decision-making, having big data does not automatically lead to better marketing" (Ducange et al., 2018). There are some challenges. "Researchers need online access to historic and real-time social media data, especially the principal sources, to conduct world-leading research: Analytics dashboards non-programming interfaces are required for giving what might be termed as deep access to raw data" (Batrinca and Treleaven 2015). It must also be mentioned that data analytics can be used for nefarious means, such as undermining the democratic process, with the recent Cambridge Analytica scandal and the explosion of "fake news" and misinformation across the internet (Smith 2020). There is a fine balance between freedom of speech and policing false and dangerous claims. Ram Mohan Rao et al. (2018) point out that another issue created by the use of all this data is the concern for privacy violation, explaining "person specific private and sensitive data like gender, zip code, disease, caste, shopping cart, religion etc. is being stored in public domain" and concluding there is always "a trade off between data utility and privacy."

Overall, once the challenges and issues—such as "the impossibility to use a unique central unit and classical storage facilities, the need for real-time analytics, the correctness of the insights, privacy preservation, and so on" (Ducange et al., 2018)—have been addressed, business analytics are overall helpful and worth the effort. "For

example, CEOs may be able to make more informed business decisions based on the derived knowledge from longitudinal social media data. The extracted knowledge could be business insights deducted from what customers are discussing on social media networks such as Facebook or Twitter about their offerings" (He et al., 2017). In general, companies that use Big Data technologies and advanced analytics

- Outperform competitors
- Make faster decisions
- Have superior financial performance (Ibid).

Practical guidance for integrating Big Data, social media and knowledge management is needed, and can be applied to "common types of social media [to] include collaborative projects (e.g., Wikipedia), blogs and microblogs (e.g., Twitter), content communities (e.g., YouTube), social networking (e.g., Facebook), virtual game worlds and virtual social worlds" (Ibid). This is where today's students fit in, on the wave of a new way of doing business. Finances Online has a predictive graphic that shows where they believe big data analytics will be growing in 2022. They took a survey on big data trends and determined that the top benefits that drive the use of data analytics are estimated to be:

- 25% faster innovation cycles
- 17% improved business efficiencies
- 13% more effective R&D
- 12% product/service

Companies plan to increase their big data analysis investment in social media data, documents/texts, clickstream media, videos/images, sensor/RFID/machine data, transaction data, and system logs.

Shevtsova (2020) says, "universities have a new task - to prepare students for working with digital data in their professional activities." They explore the programming skills required to apply existing data mining methods, and explain that modern tools are available without the need to write code (Ibid.). Hartman-Caverly (2019) suggests that "learning analytics-enabled educational technology incorporates social media-like engagement affordances" that are "designed to 'leverage students' obsessive status-checking tendencies' rather than draw critical awareness to them." Though students often begin by assessing the data "uncritically and at face-value," acquiring this skill is "perceived as a necessary competitive advantage in institutional operations."

Conclusion

Big data analytics is an essential business tool that will only grow in the future. There are some concerns with the accumulation and use of data that must be overcome, but its effective use allows businesses to gain a competitive advantage. Demand in the market will increase for students who can acquire this skill, and it is worth having at least a cursory understanding across many platforms of study, including information technology, marketing, and business.

Questions

1. Where have you noticed data analytics in your own social media use? What improvements have been made because of the ability for apps to respond to your personal data?
2. With the collection of data, privacy is a concern. Where do you think the line should be drawn? Do you think that people are more and more willing to give up personal data for convenience?
3. This article discusses how big data analytics can identify new customers, predict market trends, and suggest effective advertising. What are other ways you would put it into practice?

Teaching Notes

Case summary

Students are encouraged to use critical thinking skills to examine the use of analytics within digital marketing. They can be asked to discuss their own use of social media, how they have noticed analytics at work, and what criteria they think would be helpful for data collection. They may be encouraged to discuss how analytics can be incorporated both internally within a company and to influence customer interaction.

Teaching objectives

Big data analytics encompasses social media, digital, and location data that can offer insight into business to business partners and consumers. A business increases their effectiveness, ability to be competitive, and customer satisfaction in direct correlation to their ability to effectively embrace technology and analysis tools. Students should be able to identify sources of data, types of data that would be helpful for various business types, and the role of data analysis internally and externally.

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