



Tourism, big data, and a crisis of analysis[☆]

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ABSTRACT

Efforts to aggregate data comprehensively have prompted a crisis of analysis. Such a crisis presents itself when big data use within the tourism industry increasingly treats individuals and their subjective practices as mere objects. Heightened recognition of tourism as a series of distinctive and creative human actions is counterbalanced by an exuberance for impersonal mass quantification. A crisis of analysis is identified through a qualitative study of tourism-focused trade journal articles that address big data. This type of crisis reflects the rise of a positivistic, business-driven way of knowing that creates tensions within the tourism industry. The position and power of individuals – tourists and practitioners – is steadily undermined and capital accumulation becomes threatened due to big data use.

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Introduction

In a range of industries, including tourism, there has been a shift from conditions of data scarcity to those of superabundance. Changing technology has supported the analysis of enormous volumes of data. With the mass availability of computers possessing increased memory capacity, big data reflect efforts to quantify commerce comprehensively. Big data provide a path to transcendence where business is undertaken with greater efficiency and the problems associated with uncertainty are diminished (Davenport, 2014; Franks, 2012; Walker, 2015). Despite the enthusiasm for big data, the tourism industry has also articulated concerns about the personal autonomy, preferences, and capabilities of individuals within the context of commercially focused algorithmic methods. An impulse to achieve improved accuracy has meant that companies increasingly consider people only within the bounds of the data accumulated and processed.

The data-commerce nexus is responsible for a means of making sense of the world that is designed to be compatible with capital accumulation. This dominant logic, however, is posing problems for the tourism industry. The practices of individuals – addressed within more subjective, human-centred interpretations of tourism (Bargeman & Richards, 2020; De Sousa Bispo, 2016; Lamar et al., 2017) – are not perfectly compatible with the world of computable data. There are concerns about the use of big data that relate to the role of the individual within tourism-based commerce. Profiles of consumers generated by marketers through digital means cannot compensate for the ways in which big data analytics typically disregard certain concerns that have relevance to individuals – and, ultimately, present challenges to the process of capital accumulation.

Big data are used to conceptualize people as an aggregate; quantities, proportions, and averages are one approach to interpreting phenomena. This aggregative thrust is counterbalanced by concerns with respect to big data use. These differing per-

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spectives are expressed within tourism-oriented trade journals. There are contradictory sentiments: the commercial benefits of aggregation, on the one hand, and matters that speak to the concerns of individuals on the other – namely, the protection of privacy, the desire for personalized customer service, and the ability of non-specialists to comprehend big data analytics.

Trade journals in the tourism industry feature articles that document points of view that are emerging as the influence of big data expands within the hotel, casino, and cruise-ship sectors. Many trade journal articles that address big data canonize the use of statistics, reflecting a managerial desire for more comprehensive knowledge. However, hyper-quantification encounters criticism in these sources as well. They do not simply feature the hyperbolic marketing claims of big data advocates. These conflicted responses to big data analytics arguably signal the presence of an emerging crisis of analysis that should be considered alongside a more established knowledge-based crisis: the crisis of representation (Marcus & Fischer, 1986; Mura & Sharif, 2015). A crisis of analysis has arisen as the increasing availability of more comprehensive means of quantifying phenomena has spurred greater anxiety regarding such methods. This crisis stems from the systematic measuring of human activity and the drawbacks of such quantification for commercial ends.

Ever more sophisticated efforts to determine “accurate” patterns create the conditions for concerns that challenge the desirability of the analysis taking place. The inclination to record what can be recorded and measure what can be measured for the purposes of profit – thus aiming to make the totality visible – produces contradictions. A quest for quantified efficiency threatens to undermine the concerns of individuals, both industry practitioners and consumers, within a tourism context. “Big data capitalism” threatens to subvert its own success.

This paper initiates an exploration of data analysis itself as opposed to the information embedded within big data. Big data capitalism is not only content to commoditize human practices but also seeks to steer them through predictive analysis. People become objects from which certain raw materials – their past experiences and individual attributes – are extracted. This objectification process extends to the way in which individual privacy is not always respected, personal preferences can be disregarded, and sophisticated data analysis becomes detached from its connection with people as the methods used become more difficult for non-experts to comprehend. The desire to understand the complexity of human practice within the field of tourism studies coexists with the enthusiasm for transforming human practice into measurable data for the purposes of commercial intervention. Tourism is a domain of tensions and contradictions – between authenticity and inauthenticity (Vidon et al., 2018), between sustainability and environmental degradation (Young et al., 2015), between commodification and resistance to commodification (Higgins-Desbiolles, 2012) – and the circumstances underpinning the crisis of analysis also reflects this notion. This crisis is documented through a qualitative study of tourism-oriented trade publications. Studying human practices and the way in which tourists subjectively experience the world has arguably never been more important to tourism scholars. However, at the same time, trade journal articles indicate that the tourism industry is under the powerful sway of the business-driven tendency to enumerate and measure – and to objectify. Numbers start to take precedence over people.

Literature review

Big data: big benefits, big problems

Big data are an important decision-making tool for such disparate areas as business, government, and security. Enormous data sets can be aggregated for use by these various constituencies. A range of criteria commonly define big data – for example, volume, velocity, and variety (Mayer-Schönberger & Cukier, 2013; McNeely & Hahn, 2014). The infrastructure that supports the collection and appraisal of big data – mass computerization and teams of data analysts – enable organizations to process massive amounts of data (volume), identify value-creating relationships quickly (velocity), and integrate more diverse data sets (variety). Other “v” words have been associated with the big data phenomena: veracity, validity, and if the data were volunteered (Kitchen, 2014). The types of data being collected stem from social interactions, purchases, and travel behaviour (Mayer-Schönberger & Cukier, 2013). Big data analytics exemplify the power of digits but they are also able to extract measurable relationships from written content extracted from social media channels (Höpken & Fuchs, 2016). Various forms of data support the analysis practiced. Underpinning the enthusiasm for big data use is an approach to knowing the world that foregrounds aggregation; an attempt is made to conceptualize phenomena wholly.

Big data analytics are typically approached in two ways. First, there are authors who embrace the rise of big data as part of the quest for efficiency and as a means to ease the burdens associated with unpredictability (Davenport, 2014; Franks, 2012; Walker, 2015). These sources offer advice to organizations. Enthusiastic claims are made about the power of big data to revolutionize business and society. Empiricism and statistical analysis are applied more widely as increasingly comprehensive collections of data – data that capture the attributes of entire populations as opposed to those of smaller samples – become more accessible (Mayer-Schönberger & Cukier, 2013). The minute quantification of existence is viewed as the path to the comprehensive awareness of noteworthy patterns; extreme accuracy is highly prized as is rapid analytical insight.

A boldness characterizes the claims made by big data advocates. Theory is deemed to be unnecessary when it is possible to analyze samples that resemble the entire statistical population in terms of size (Mayer-Schönberger & Cukier, 2013). The profusion of information helps to expose relationships; “what” is taking place becomes more important than asking “why”. Correlation is as good as, if not more important than, causation. However, despite the argument made for data-centric research that side-steps theory, theory is implicitly present (Mazanec, 2020).

The big data phenomenon has been approached a second way, one that adopts a more critical perspective (Kitchen, 2014; O’Neil, 2016; Tanner, 2014). This perspective notes that the rise of big data is concerning due to the disappearance of personal

privacy. Valuable information is provided by eager consumers seeking compensation for their cooperation. The actions of the casino sector have received scrutiny (Tanner, 2014). Visitors sign up for card-based membership programs which monitor their gaming behaviour and offer targeted discounts as well as, for the high spenders, complimentary meals and hotel rooms. These rewards encourage repeat visitation.

Although consumers are rewarded for their complicity, the data-driven economy is conjuring a world divided into those who watch and those who are watched. Tourism-related experiences as well as day-to-day purchasing are refined into data that can be monetized by corporations (Tanner, 2014). Exactitude and analytical practices offer insight but they are also a form of power. Understanding consumers through the prism of big data reflects commercial imperatives.

The personalization of products and services is thought to be possible as data are assigned categorical meaning by marketers (Anshari et al., 2019; Buganza, Trabucchi, & Pellizzoni, 2020; Piccoli et al., 2017). This ability to personalize reflects only that which can be counted; the empirical assessment of data patterns is made in accordance with the use of a particular set of variables. Personalization is perhaps more aptly described as “profilization” under these circumstances whereby the data collected, rather than creating “accurate” representations of consumers, generate measurable commercial personas (Cheney-Lippold, 2017). As more personal data are stored and manipulated, the need to scrutinize these activities has become more acute as well as the business-oriented aspirations driving their use.

Tourism, statistics, and analysis

The influence of big data has been felt within the field of tourism studies. Tourism scholars appreciate the transformative potential of big data and are excited by the possibility of converting more dimensions of human behaviour and commerce into data points (Gunter & Önder, 2016; Li et al., 2018). The growth of tourism as a global phenomenon has been matched by a body of work within which tourism has often been operationalized in a positivistic manner and viewed as a predominantly profit-generating economic activity (Duffy, 2014; Tribe, 2008). Tourism is routinely measured quantitatively. An extensive array of statistics related to human mobility is recorded for commercial and administrative purposes (Volo, 2020). However, simultaneously, tourism scholars have come to appreciate the importance of individual practice (Bargeman & Richards, 2020; De Sousa Bispo, 2016; Lamar et al., 2017). Tourism, from this perspective, is an intensely human endeavour and not simply a quantifiable and commodified experience. When tourism is understood purely through numerical means, the influence of managerial thinking and business imperatives is readily observed. The people behind the data recede from view; the pursuit of profit shifts to the foreground. Objectifying people becomes a byproduct of trying to understand them in greater detail and in numerical terms.

Big data researchers in the field of tourism studies routinely strive to analyze vast collections of information available from many sources. The formidable appeal of big data is the ability to produce correlations that identify commercially exploitable relationships. Tourism demand is examined (Li et al., 2020; Xie et al., 2021) as well as noteworthy patterns within the hotel and air travel sectors (Pan & Yang, 2017; Park & Pan, 2018). Researchers who use big data often explore the marketing possibilities that are an extension of their work. Big data, in these contexts, privilege a particular way of knowing which underestimates the importance of theory, promotes a science of correlation (Mazanec, 2020), and is oriented towards the analysis of commercial matters. Privacy and power relationships have been addressed (Line et al., 2020) but it is the desire to improve business performance and enhance travel consumption that dominates the research agenda. The findings typically have the potential to enhance understanding of tourist behaviour, improve marketing effectiveness, and inform product development (Antonio et al., 2019; Talón-Ballesteros et al., 2018; Villamediana-Pedrosa et al., 2019).

Skepticism and concern regarding the use of big data are not common themes in the field of tourism studies. Such themes do inform explorations of the relationship between tourism and technology. There is, however, work that examines the phenomenon of alienation that results from the (over)use of information and communication technologies by tourists (Tribe & Mkono, 2017). The tension between enchantment and apprehension has also been addressed in relation to tourism and technology (Cohen & Hopkins, 2019). The impact of technology has been viewed both favourably and unfavourably. Critical appraisals of information technology in a tourism context have also been advanced (Cai et al., 2020; Gretzel et al., 2020). There are authors who place their faith in technology as well as take the time to understand complex social and historical processes. Belief in the value of big data may remain widespread but there are also concerns about equating human experience with algorithmic insights (Cheney-Lippold, 2017; Pasquale, 2015). The use of big data is responsible for a digitally filtered positivism, but other perspectives are present.

The crisis of analysis addressed in this paper can be considered alongside a more established crisis in academia: the crisis of representation (Marcus & Fischer, 1986; Mura & Sharif, 2015). A crisis of representation has arisen because written and oral accounts of events are viewed as partial and the product of perspective, not as objective depictions of social reality. The current era of growing big data use would seem to be responsible for an emerging crisis of analysis. Efforts to analyze phenomena more comprehensively in the aggregate, to capture a situation in full, encounter the concerns of individuals as identified by industry practitioners. The crisis of analysis speaks to the tension between, on the one hand, the desire to capture totality and, on the other, critiques articulated by industry commentators regarding such efforts. This crisis has commercial implications in that capital accumulation is potentially placed at risk when aggregative endeavours do not consider concerns that relate to individuals. Big data, as the engine that powers data-intensive capitalism, threaten to alienate, disenchant, and confound those individuals – consumers and practitioners – who are crucial to the functioning of tourism-based commerce.

The growing acknowledgement of the agency of subjective human beings in tourism scholarship (Bargeman & Richards, 2020; De Sousa Bispo, 2016; Lamar et al., 2017) coincides with the rise of big data use in the tourism industry. As companies continue to grow into global markets and collect more information from users, it is important to explore the human implications of data

analytics. Treating people in a way that solely reflects the significance of commerce and quantification – as if they are objects – threatens to exclude the unquantifiable. The data by themselves start to define what is present and possible: what is not captured becomes difficult to classify and potentially invisible. Simply emphasizing the measurable and numerically tangible threatens to diminish the human dimensions of tourism.

Methods

Understanding the use of big data as a commercial tool and the concern that surrounds certain analytical activities require a source of data that would help readers comprehend current activities and future possibilities. Trade journals are specialized business periodicals that address issues relevant to an industry (Carpenter & Upchurch, 2008; Wilkinson & Merle, 2013). Practitioners are contributors to trade journals as well as the targeted readership. The more complex the relationship between business and big data becomes, the greater the need for timely commentary that satisfies the professional needs of practitioners. Trade journals often feature oppositional perspectives because they contain articles that offer expert advice rather than merely express “facts”. They are an ideal source of data for a study that explores issues related to present-day capitalism because they are written for professional communities rooted within the market economy.

Trade publications in the tourism industry contain articles that profile the aggregative capabilities of big data, phenomena imagined as the sum of the whole, and the perspectives of those who view big data analytics skeptically – especially in relation to the role of the individual. This context is provided by industry participants and observers evaluating opportunities and threats with respect to ongoing commercial objectives. Exploring these conceptualizations of big data means analyzing written works prepared by industry practitioners and commentators regarding their actions with respect to big data. Trade journals offer a window into the way in which tourism providers have confronted the introduction of big data analytics.

Trade publications not only document events and reflect opinions, but they also help members of a particular professional community interact with each other in meaningful ways. In professional communities where members cannot always network with each other face to face, print material plays a vital role in spreading ideas of mutual importance, fostering a sense of fraternity, and establishing an agenda for the future (Anderson, 1991). Trade publications typically publish at regular intervals, often monthly or quarterly, and their reporting exposes industry participants to practices outside of their personal domain of familiarity.

The serialized nature of trade journals facilitates the creation of persistent connections between these periodicals and their readers. Through the cycle of recurring publication, trade journals become a connective thread that ties together professionally oriented communities of practice. Many trade journals provide indexes, typically published in the end-of-year issue, that enable subscribers to search for articles that address certain topics (Diamond & Oppenheim, 2004). Such indexes anticipate that the trade journals will be kept for future reference. Compared to newspapers, trade journals are not necessarily discarded as quickly and the tendency for them to be retained speaks to the possibility of a more enduring impact.

Trade publications must be used as a source of data cautiously. Various biases prompt editors of trade journals to include certain types of content. There is certainly boosterism with respect to the use of big data. However, trade journal articles do not simply contain the confident commentary of enthusiasts. These sources also include the voices of a broader range of practitioners, including those who express wariness. Trade journal articles document ideas that have developed as big data use diffuses throughout the industry. The sample captures recent exemplars of big data use and industry commentary.

Some of the written accounts that constitute the evidence for this study contain blatant sales pitches. The dreams and aspirations that are a part of this unambiguous promotional rhetoric are important human products that define the boundaries of the imagination within an industry and aspects of the prevailing mind set. Such content is not pure fantasy; its point of departure includes current conditions that relate to the nature of commerce and its progression. This type of content signals prospective futures and shapes conversations practitioners have with themselves about the present – and possibilities for tomorrow.

The sources of data used in this paper are articles that have been published in trade journals such as *Hospitality Upgrade*, *Casino Journal*, *Pax International*, and *Travel Weekly*. These articles were accessed via the database *Hospitality and Tourism Complete*, a repository of academic and non-academic publications. The search terms “big data” and “tourism” were used in combination with each other to obtain the articles. “Big data” and “hospitality” were also paired. The use of “tourism” and “hospitality” within the searches was deliberate and ensured that trade publications related to food sciences were excluded. The sample consists of trade journal articles published between 2014 and 2019. Recent discourse with respect to big data was sought. The six-year period under examination was one where references made to big data were the most numerous. In total, there are 44 articles in the sample, ranging in length from a third of a page to nine pages.

Only print-based trade journals were consulted. Future research could analyze digital sources. Whether print or digital, trade journals offer guidance to the business community and enable occupational groups to share ideas and feel part of a broader, professionally focused collective. This statement is as true of blogs as it is for paper-based trade journals. Therefore, while the technology continues to evolve, the power of trade publications to unite and promote debate persists. They continue to have trusted subscribers. Reputable trade journal articles are easier to identify via *Hospitality and Tourism Complete* compared to digital trade publications whereby one would need to devote a considerable amount of time to pinpointing credible sources in amongst the more questionable ones that would surface as a result of Internet searches.

There are drawbacks to the approach that has been taken with this research. The impact of specific articles is difficult to measure. How have (some of) the articles influenced thought or action within the tourism industry? How are articles read or understood by industry professionals? Trade journals do, however, represent a conveniently available source of evidence with respect to

the views of industry-based experts. They are widely circulated; their subscribers are sometimes situated around the world. Recent scholarship notes the value of trade journals to industry practitioners (Peck, 2015; Vong, 2017).

Published commentary with respect to big analytics does not always praise its use. From trade journals, one extracts different perspectives. These perspectives are often expressed through industry-based examples: hotels, casinos, and cruise ships. An inductive thematic analysis was used to find common threads in amongst the different perspectives. Trade journal articles were read and annotated repeatedly in order to develop a deeper understanding of their content and to identify patterns or “meaning units” (Creswell, 2012, p. 79). Patterns were catalogued into themes. One broad idea around which various themes could be structured relates to the functioning of capitalism. The varied themes noted were then incorporated into an overarching narrative that had the data-commerce nexus at its conceptual centre. This nexus is featured across scholarly works that address the social and commercial consequences of big data use – for example, the enthusiasm for creating points of data that can be mathematically evaluated and the concerns expressed regarding privacy and depersonalization.

Creating the overarching narrative started with the identification of six themes. Three themes relate to the excitement associated with big data aggregation and the way of knowing it buttresses: the commercial opportunities offered by the comprehensive accumulation of big data, the potential for big data to drive transformational change, and the positive possibilities offered by a numbers-driven future. The three other themes reflect the wariness practitioners and commentators have with respect to big data, specifically in relation to individuals. These three themes are pervasive surveillance that is seen to be dystopian in nature and a violation of personal privacy, the depersonalized provision of customer service, and the potential for big data to overwhelm and confuse individual users. A series of anxieties coexist alongside the excitement. This tension, pivoting around aggregation and the rise of objectification in relation to the concerns of individuals, is at the core of the crisis of analysis. Catalyzing this crisis has been the role of data-intensive capitalism as a driver of growth in the tourism industry and as a force that threatens to undermine this same growth.

Findings

Big data and aggregation: commerce, change, and the future

Big data provide a pathway to a totality of understanding that promises better commercial returns. The range and volume of data sources available to, for example, casino operators generate excitement regarding business intelligence. Two industry observers catalogue an array of means by which data can be accessed:

Consider the diversity of traditional data sources in the casino industry today, with systems like slot and table player tracking, slot and table accounting, cage accounting, bingo-poker sports, hotel, food and beverage, employee tracking, valet, spa and many others. New sources abound such as social media, VIP player communications and preferences, and many others as the Internet of Things (IoT) becomes more...relevant to our business (Cardno & Thomas, 2016, p. 20).

The data that can be accumulated would seem plentiful.

A similar situation is articulated by the chief operating officer of the hotel marketing firm, Fuel, through a description of its data analytics dashboard, Fuel Gauge. Relationships that were once indiscernible surface:

By aggregating data from social media channels, the property website, TripAdvisor, the property management system, email campaigns, Google Ads, search engine ranking software, guest satisfaction surveys and more into a single tool, hotels are now able to see correlations between data that was previously invisible (Carlino, 2019, p. 36).

Crucial patterns that have revenue generating potential present themselves to analysts when data sourced from different origins are combined. A more complete portrait of processes and people – specifically, consumers – emerges. The integrative nature of big data identifies significant and profitable patterns but also precipitates a crisis of analysis due to the desire to understand phenomena in toto. Pursuing the exhaustive collection of data underpins a crisis that is attributable to a desire for comprehensiveness and is associated with the objectification of those targeted.

A form of data-driven enthusiasm is identified by the editor of an airline industry magazine, *Pax International*, in relation to the cruise industry. This enthusiasm is tied to the existence of firms that support data aggregation. A Google search described by Lundstrom (2015), one that considers big data in relation to the cruise industry, “yields a little more than 12 million results” and

[t]he first [results] to appear are software companies seeking to market their products to cruise lines. With the information gleaned from big data, one company promises the ability to help cruise lines identify successful upsells, booking trends, maximizing occupancy, and preventing cancellations through overbooking (Lundstrom, 2015, p. 3).

Various benefits are touted when organizations tap into a wealth of data and construct more thorough, statistically informed depictions of their business activities. Exactitude and certainty would appear to be antithetical to a crisis that has ties to rigorous analysis and quantification rather than factors that contribute to such a crisis.

Technology provides a vehicle for knowing the activities of consumers within a defined domain, such as a cruise ship, extensively:

With passengers making use of key cards and other devices, a digital footprint is created with each swipe. Spending is tracked, sales points on board the ship are logged and back office personnel have the luxury of analyzing every transaction to maximize revenue (Lundstrom, 2015, p. 3).

The capacity to record the behaviour of passengers is comprehensive. Contained cruise-ship environments offer exciting possibilities with respect to a “total” way of knowing within a “total institution”. Exciting prospects for some, however, may be frightening and intrusive for others.

Failure to adapt to the rise of big data has hazards associated with it. Numbers are perceived as a way to achieve objectivity; choosing not to obtain a more aggregated view of the commercial realm and to ignore big data analytics has drawbacks:

Have you considered the cost of not knowing? The cost of increased exposure to risks, the cost of missed opportunities and the cost of inefficient use of resources? Ignoring Big Data and the potential value of the deeper insights it can provide to your analytics can end up being much more costly than you think (Ayisi, 2014, p. 10).

The pursuit of accuracy and an extensive understanding of phenomena through the rigorous quantification of commercial activity is a means to achieve complete awareness of useful, and ultimately profitable, connections. Seeking to know phenomena completely has its advantages but it is also an impulse that spurs the crisis of analysis.

A narrative tied to the concept of change operates in conjunction with the belief that big data creates beneficial commercial opportunities through greater aggregation. There has been a dramatic change in the technological capabilities available to firms that analyze massive amounts of data. Big data are seen to be imbued with the power to provide more detailed depictions of consumers:

The pace of technology development is accelerating so we can no longer measure it in decades. The post 2015s added the i's (iPhone®, iPad®) to the e's (e-commerce, email). As mobile exploded, it's now possible to know exactly where the guest is, and influence their next action directly. Location data explodes the volume of data once again, and accelerates the importance of responding to velocity as well. You could say even the guests are becoming transparent...whether they like it or not (McGuire & Osborn, 2017, p. 116).

Big data are transformative. They are becoming increasingly comprehensive as their volume grows and the ability to produce insight quickens. Such thoroughness and speed may be data-driven hubris, however. There are implications associated with implementing rapid change that makes individuals – the guests – more visible and “transparent”.

The capacity to convert non-numerical phenomena into quantifiable values so that they can be analyzed represents a significant change introduced by big data and related efforts to comprehend consumers, trends, and commercial relationships more fully. Statistical appraisals are applied to domains not previously subjected to such approaches. According to one writer for the casino industry publication *Slot Manager*, there are ways to create analyzable data from sources that were not previously seen as having such potential:

[E]xperts say that 70–90% of the data that business generates today is in unstructured formats such as e-mails, blogs, click screen data, call center records, text data, GPS and location data that is not easily structured into rows and columns (Clemens, 2014, p. 14).

Big data analytics is not yet buttressed by a stable set of technologies. Technical capabilities are evolving; the frontiers of analytical sophistication are advancing. A growing volume of content – flowing into and out of organizations – is becoming analyzable. The typical assumption is that more data are better; the proposed crisis of analysis suggests a different conclusion.

Technological developments and the changes they usher in are accompanied by certain images of the future. There are expectations regarding the anticipated use of big data. A more profitable future is within reach. Exciting predictions are made by analytics professionals affiliated with a “global business advisory firm” called AlixPartners LLP (Carter & Ceccarelli, 2014, p. 39):

A future guest accesses the casino website, looking into entertainment, restaurants and poker tournaments. This mid-value guest books a hotel room by using a promotional code offered during the online session, prompted by the casino host. The guest had gone into four pages of depth into the Britney Spears concert web pages but didn't book tickets. When the guest arrives at check-in, an offer for 20% off Britney Spears tickets is made because the recommendation engine matched the guest's interest in the concert with the revenue management identification of excess inventory and the forecast value of the guest's trip. The associated analysis included all data points from all captured online sessions, dozens of propensity calculations and revenue management calculations not just for hotel room occupancy and average daily rate but also for every venue and event at the resort as well as guest expected value under numerous scenarios of offers (Carter & Ceccarelli, 2014, p. 38).

The more that technological advances triumph over distance, time, and inconvenience, the more exciting they are and the more they appear to demarcate an inspiring route to a tantalizing future. There are commercial opportunities related to big data that have not yet been realized. A crisis of any description, including one related to analysis and objectification, would hardly seem to be part of a thrilling vision of the future.

The casino industry is renowned for its use of data but, at the same time, seems not to have exploited the potential of big data analytics completely:

The gambling industry is sitting on one of the largest databases in the world when it comes to high net worth customers, but barely a handful of operators have actually embraced true Big Data functionality, relying instead on conventional, outdated business intelligence (BI) software and hoping that will be sufficient (Bertilsson, 2014, p. 52).

The possibilities offered by a future shaped by big data are seen as desirable and thus warrant swift action. A more prosperous future may be a matter of making some sage investments with respect to analytics.

At a time when the impossibility of objectivity is being addressed by tourism academics as well as scholars in other fields of study, the logic underpinning the quest for comprehensiveness and a desire to identify absolute accuracy through aggregative empiricism remain. A crisis of analysis is, in part, taking shape because big data have become a powerful, trusted tool to manage aspects of the world of business and tourism. Big data, however, positions individuals – often consumers – as subject to the protocols and objectifying gaze of those who analyze the data for commercial gain. The individual is, in some ways, the antithesis of big data: singular and unaggregated in nature. Trade journal articles address several matters related to the concerns of individuals in the context of big data analytics.

Individual concerns: dystopian surveillance, depersonalization, and the data deluge

The enticing aspects of big data that have been addressed – the commercial benefits of aggregative quantification, the positive change associated with such attempts to comprehend the whole, and the appeal of an exhaustively rendered, statistics-driven future – must be considered in association with those individuals who are enumerated and those who enumerate. The pursuit of comprehensiveness invites enthusiasm for present-day and future commerce but it also signals the presence of a crisis of analysis. Examining phenomena in the aggregate potentially prompts problems related to the comprehensiveness and depth of the analysis as the autonomy, preferences, and capabilities of individuals are thought to be overshadowed by exhaustive big data dissection. Despite recent scholarly attention devoted to the subjective human practices of tourists, big data use in the tourism industry increasingly treats people as objects for purposes related to profit maximization. This phenomenon deserves attention.

Three themes related to big data and the role of the individual are prominent. First, the desirable future already described may devolve into a dystopian regime of mass surveillance that undermines personal privacy. A profitable future for corporations practicing comprehensive data collection is, potentially, an intrusive one for the individual consumers who are being observed digitally. A second theme is the depersonalization of customer care, a problem especially worrisome in a service-based industry such as tourism. Third, big data may create circumstances that can overwhelm individuals seeking to make sense of tourism trends; more data does not necessarily generate deeper insight. The data exceed the non-expert human capacity to comprehend them. These three responses to big data use, each one oriented around the role of the individual, are a reaction to analytical and commercial practices that seek to define the world more completely. People and their subjective human practices become objectified as analysis intensifies.

That big data can facilitate mass surveillance is consistent with dystopian depictions of the future. Understanding the tourism industry in aggregative terms potentially prompts an understanding of the whole that makes many individuals uncomfortable. References are made to the “Big Brother” phenomenon – authoritarianism via mass observation as per George Orwell’s novel 1984 – in trade journal articles. For example, an article that explores casino marketing mentions it:

In his 1949 novel “1984”, George Orwell invented the fictional dictator “Big Brother”. Signs throughout Oceania warned “Big Brother is watching you”... Today, Big Brother follows every website we visit, every subscription, everything we search, view or buy, even our current location (Geoghegan, 2015, pp. 172–173).

Worry is expressed regarding the monitoring associated with big data analytics.

A partner at Dare to Imagine, a firm that provides hoteliers with technology-related assistance, addresses the connection between big data and mass surveillance by stating that “[w]hether you like it or not, or know it or not, most everything you do is being tracked by somebody. And, all of that makes up what people call Big Data” (Phillips, 2015, p. 152). Big data invite the possibility of an oppressive form of counting and recording designed to encourage obedience and heightened consumption. This form of monitoring is reductive and objectifying as individuals are simply viewed as prospective consumers who become the targets of marketing interventions. The boundary between commercially valuable information gathering and privacy is one that provokes advice from the authors of certain trade journal articles and the experts they quote (McGuire, 2016; Warner, 2014). A threshold could potentially be crossed, one that prompts a firm to be criticized for its data collection activities, which causes reputational harm.

Big data are seen to provide the basis for better business decisions. However, there is the risk that data analysts and marketers will become disconnected from people who are represented by the statistics. “Profilization” and the making of datafied, measurable personas do not always successfully generate personalization (Cheney-Lippold, 2017). Human traits are embedded within the data but they become objects of enquiry that can grow distant from the individuals who are measured and evaluated. For instance, a vice-president of a travel marketing firm, Sojern, warns that “[w]ith data marketing today, you can get things more wrong than ever before. You can pretend to know someone” (Parsons, 2014, p. 25). This notion that “travel companies must not lose sight of the fact that customers are real people” (Parsons, 2014, p. 25) is echoed by other industry observers who believe that big data use could undermine the importance of “guest recognition”:

Today, some hoteliers think the key to winning the battle is to leverage our service systems and splash a small dose of big data in a dialog box, so that service agents can feign recognition. Or better yet, we could just give our guests smartphone apps and keyless entry systems so that they can bypass the human interaction of the front desk altogether (Schubach, 2017, p. 36).

People – namely, employees – are a significant component of service provision and their contributions are potentially obscured by the enthusiasm for big data. Efforts to measure specific situations can become detached from the human qualities that shape them.

The founder of Hitlist, a smartphone application “that uses big data and personalization to alert users when cheap flights are available for trips they want to take”, has indicated that “it’s possible to put too much stock in what the data said and not enough into personal context and social recommendations” (Biesiada, 2016, p. 36). Treating individuals as objects to be assessed has drawbacks. Truly personalized customer care, for some commentators, fades from prominence when big data analytics take precedence. Technology designed to enhance personalization may paradoxically threaten it. Big data fosters the expansion of human knowledge with respect to consumers, on the one hand, and sometimes a sense that one – as a consumer – is individually insignificant, from the perspective of service providers, on the other. The consumer is thought about deeply and also, simultaneously, is an afterthought.

Tourism providers may confront the consequences of an overabundance of data. Although the value extracted from big data analytics would seem promising, many people do not have the necessary expertise to identify patterns and interpret findings. One industry commentator observed that “[u]nderstanding big data and how to convert it into profitability is a challenge many are still learning to overcome” (Wunderlin, 2017, p. 60). A problem that accompanies enumerating more comprehensively is that the resulting numbers grow in volume. Their quantity and complexity surpass conventional individual awareness. The accessibility of the data grows out of reach, available only to insiders. Big data assume a form whereby they exceed the capacity of non-experts to interpret them. Objectification occurs as advanced statistical analysis and the compilation of enormous data sets become further removed from the realm of ordinary human practice. The numbers assume a prominence that diminishes most people to the status of insignificant adjuncts who are merely tabulated – as opposed to individuals who can contribute to the analysis that is taking place.

Even for travel providers that possess size and scale, such as major air carriers, the realm of big data is difficult to fathom. The air travel sector needs to take “the necessary next steps” with respect to managing operations as it “dips its toe into the sea known as Big Data” (de Montfort Walker, 2014, p. 74). The benefits of big data analytics cannot be separated from unwanted outcomes: “‘big data’ can be a big help but it can also bring an organizational nightmare” (Maras, 2015, p. 58). For those seeking to undertake analysis, “it’s really easy to get distracted by big data, going down rabbit holes, finding meaningless patterns, and making erroneous conclusions” (McGuire, 2016, p. 164). The enormous quantity of statistical information made available creates exhilaration regarding possible interpretative insight but it is also a source of concern. Big data possess attributes that weaken their attachment to people and organizations. The data possess features that render them distant from the individuals who are represented by the statistics as well as from the non-specialists who try to interpret the results.

It is recommended that use of big data by individuals or within organizations should be incremental in nature. This approach is advisable because “the potential topic is so huge that it would be overwhelming to try to do it all at once, and so start with a small, well-defined operational area with clearly defined benefits” (Inge, 2015, p. 116). Similar sentiments are expressed by the chief executive officer of ReviewPro, an analytics firm, who indicates that “the proliferation of big data runs the risk of overwhelming hoteliers” and that “[o]ne very clear application of Big Data analytics for hoteliers is the mining of guest feedback data, both from the social web and from direct survey responses” (Nath, 2015, p. 1). There is a sense that more data do not always improve the process of evaluation: “[s]ometimes adding more data to an analysis does not result in a better answer” (McGuire, 2016, p. 166). Rather than always generating greater understanding, the sheer volume of data available for appraisal has the potential to become burdensome. The difficulty associated with counting more comprehensively is that the resulting data are not always accessible; they become harder to interpret. A form of objectification takes place as modes of data analysis become increasingly complex and detached from the comprehension of non-experts.

Discussion

Technology and big data, when studied by tourism scholars, are often presented as contributing to universal betterment. They assume an aura of the necessary and the positive. There are some exceptions to this perspective regarding the general treatment of technology and big data in the field of tourism studies (Cohen & Hopkins, 2019; Mazanec, 2020; Tribe & Mkono, 2017) but

there is scope to explore anxieties and contradictions in more depth. The processes that makes big data more comprehensive in terms of their reach are also responsible for the varied responses to their use. Examining industry perspectives with respect to big data shifts the study of tourism and analytical practices away from an approach that emphasizes neutral instrumentality and rudimentary functions towards one that addresses the way in which innovations are interpreted by social actors – for example, industry commentators and senior managers. There is also the prevailing function that big data perform. They are a means to an end – capital accumulation – within tourism-based commerce.

Big data analytics promise accuracy but the domain of aggregation, statistics, and developing thorough representations of phenomena is a complex site of competing points of view. The impossibility of objectivity that is fundamental to the crisis of representation (Marcus & Fischer, 1986; Mura & Sharif, 2015) is not unrelated to the crisis of analysis. Pursuing objectivity has a price: the objectification of people that occurs as big data become more widespread and their attachment to the human beings they represent becomes significantly strained. That big data analytics can be a substitute for understanding tourism comprehensively is challenged by perspectives that emphasize worries about surveillance, depersonalization, and the ability to comprehend complexity. The crisis of representation addresses the impossibility of objectivity; a crisis of analysis speaks to the drawbacks – in human terms – that accompany the determined pursuit of objectivity and exhaustive understanding.

Conceptualizing a crisis of analysis is relevant at a time when big data analytics is such a prevalent part of capitalism. Recent efforts to understand tourism as a series of human practices (Bargeman & Richards, 2020; De Sousa Bispo, 2016; Lamar et al., 2017) are a reminder that digital precision in the commercial realm cannot eradicate the significance of people as both consumers and industry participants. Big data are staggering in terms of their breadth and scope but aspects of their use bypass concerns that have been articulated, especially with respect to individuals. The crisis of analysis questions the assumption that statistically formulated individuals best represent the concerns of individuals in a datafied tourism industry. A common tendency to value only that which can be enumerated does not always add up.

Turning everything into measurable data has potentially severe consequences for broader perceptions of worth and value in the tourism industry and across society. The pervasive use of big data emphasizes what is more easily quantifiable in comparison to what is not. People – tourists and tourism managers – conceivably become subservient to the analysis of numerical data and fall out of the equation. The value ascribed to phenomena that are measurable compared to those that are more difficult to measure has diminished the value of certain human concerns – privacy, personalization, and easy comprehension – vis-à-vis money making endeavours. There would appear to be sectors of the tourism industry – an industry that should be well positioned to understand the importance of subjective human practice and individuals' experiences – that are growing conscious of the problems associated with purely data-driven approaches to commerce. When the tourism industry is reduced to valuing technocratic measures only, and human beings are treated as mere objects for production and profit, the risk is that other considerations will be either ignored or forgotten.

The crisis of analysis signals that capitalism in the era of big data possesses the capacity to undermine itself when it solely addresses the broad, operational whole. Business-driven impulses to achieve certitude create conditions that are potentially – and ironically – incompatible with the interests of business. The crisis of analysis encompasses a tension or contradiction that relates to trying to know phenomena, such as tourism, as completely as possible within a commercial context. An increasingly corporate data collection infrastructure threatens to undercut those aspects of capitalism that have a human dimension to them; privacy is invaded, commerce becomes increasingly depersonalized, and analytical practices become more inaccessible to non-specialists. The crisis of analysis has implications for the functioning of capitalism but also a tourism industry that seeks to maintain meaningful connections with individuals: tourists as well as industry practitioners.

Conclusion

This paper, in the context of tourism, explores the use of big data analytics as opposed to patterns contained within a particular set of big data. Big data positions people, often consumers, as subject to the practices of those who gather and analyze the data for commercial gain. Taken too far, analysis poses problems – even within industry circles. The power of the aggregate exists in tension with the importance of the individual. This tension defines the crisis of analysis. Positivist notions of progress towards a final, quantifiable form of accuracy have been coming undone within academia. A similar phenomenon would appear to exist within the tourism industry. Generating knowledge about social wholes enables organizations to envisage large aggregates. However, seeing phenomena in purely data-oriented terms means that efforts to achieve comprehensiveness are pursued to the exclusion of a sensitivity to the concerns of those individuals who are the parts that compose the whole. Quantifying tourism for business-related reasons has implications for its human dimensions. People and their subjective practices become objectified.

A consequence of this study is a realization that big data operate at a resolution that essentially eclipses the individual. The concerns and perspectives of individuals appear distant from the practice of big data analytics. Within the realm of big data, individuals are not viewed as human agents who survey the world as they interact with it, changing and being changed by it in turn, and making their own personal judgements. They are, instead, perceived as data points; human behaviour is subject to modelling and prediction. Big data reflect confidence about technical progress but often represent people as impersonal, objectified aggregates. Tourism and capitalism, as practiced at a human scale, encounter problems when data analytics become an especially prominent way of knowing and earning. There is reason to be cautious about blindly using big data, regardless of how attractive the findings might appear. Tensions and contradictions characterize tourism – for instance, in relation to authenticity, sustainability, and commodification. The crisis of analysis is similarly an expression of this phenomenon: the tendency to quantify via big data confronts more people-focused counter tendencies.

Future research opportunities abound. There is scope to explore the notion of a crisis of analysis in more detail. The nature and depth of this crisis is bound to evolve as approaches to data collection become more sophisticated. An ability to collect more comprehensive data sets and analyze them with greater exactitude will probably continue to increase. Big data disrupt conventional ideas regarding speed and duration in relation to analysis; they generate instantaneous results that defy the constraints ordinarily imposed by time. The casino or hotel marketer achieves rapid access to data related to, for example, the purchasing behaviour of consumers. This changing capacity to gather and interpret data is agreeable to the unwavering capitalist ethos of growth and stability. Heightened travel is an important component of continued economic expansion. The relationship between continuity (commercial imperatives that operate within the tourism industry) and change (progress in the area of data gathering and analysis) could be studied further. There are also ecological considerations. Efforts to promote more travel through big data analytics pose challenges with respect to environmental sustainability.

The crisis of analysis may have connections with a different crisis – one tied to human agency and the impulse to create a data panopticon. This crisis, similar to the crisis of analysis, is oriented around the relationship between the aggregate and individuals. It is arguably a crisis of self-determination. Freedom has evolved to become a personal state that more closely resembles defined outcomes than individual, open-ended choices; people are “nudged” towards “better” decisions (Thaler & Sunstein, 2008). The human agency that is actively asserted over one's own future begins to be bypassed by predictive, data-driven mechanisms. Algorithmic patterns become responsible for a more prescribed future. The marketing material one sees in relation to tourism – or other sectors of the economy – is carefully curated so that it matches preferences; the individual is only exposed to a range of marketing appeals that correspond to his or her designated customer segment.

There is already a profound shift taking place regarding the power possessed by data within society: data, rather than merely representing the world, start to become a world, a digital one, unto itself. This world becomes a place where no “unknowns” remain to be discovered, only a perpetual gathering of records to be cross referenced and analyzed. What types of independent action can individuals undertake for themselves in the context of tourism with the accumulation of ever-larger archives of data? As every movement – “real” and virtual – and every economic transaction are converted into data, human experience becomes a resource to be mined. A crisis of self-determination mirrors a crisis of analysis: data are a powerful tool to construct and manage the social world, including tourism, but they have serious implications for people, namely those who become the objects of analysis.

Declaration of competing interest

None.

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