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SALIENT ISSUES IN MARKETING ANALYTICS

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ABSTRACT*: The paper utilized materials from relevant extant literature and cognate experience to discuss marketing analytics with regard to its tools, relationship with big data, applications and challenges, and proposes research direction in cognate areas. Specifically, the paper posits that marketing analytics has some salient issues such as equivocal conceptualizations, strong connections with big data, myriad of tools and applications, in addition to associated challenges. These stated salient issues may not be exhaustive enough to represent all the cognate issues associated with marketing analytics, especially in contemporary times. This is a major limitation of the paper which can be addressed in future research efforts. Therefore, relevant empirical research streams are suggested in the paper to investigate these salient and other cognate marketing analytics issues in different contexts, including sectors, business types, and countries. The insights from the paper are likely to have practical and theoretical implications and relevance for marketing managers, organizational researchers and data scientists, among others, regarding marketing analytics tools, applications, connections with big data, and implementation challenges.*

KEYWORDS: Marketing, data analytics, marketing analytics, big data, machine learning tools.

INTRODUCTION

The data analytics domain generally refers to approaches, tools and technologies that provide understanding and insights from datasets for individuals and organizations. It provides valuable data and information for efficient and effective decision-making in various aspects of the organic business functions, with marketing having relative dominance in the research applications of data analytics. Marketing analytics is an aspect of data analytics concerned with the exploration and analysis of small, big, structured and unstructured data, including qualitative and quantitative data, in order to develop understanding, extract insights, and formulate actionable results for efficient and effective marketing decision making. It entails marketing data collection, data cleaning and warehousing (storage), data modeling and analysis, and reporting of results for marketing decision making using relevant tools and algorithms. It has connections with different cognate disciplines such as marketing, computer sciences, mathematics, statistics, and operational research, among others. There are some issues of interest to theorists and practitioners in the domain of marketing analytics which have been treated generally, scantly, and/or ignored.

Marketing is concerned with mutually-satisfying exchange transactions and relationships which are purposed to lead to the achievement of marketing efficiency and effectiveness. Many frameworks, including the marketing-mix framework and its revisions (Tukey, 1962; Winer & Neshin, 2014; Prohit et al., 2021), have been used to explain marketing issues. Also, many cognate disciplines have contributed to the development of marketing theories and practices. One of such disciplines is data science. According to Turkey (1962), data science is concerned with procedures for collecting and analyzing data, techniques and tools for interpreting results from such procedures, ways of planning the gathering of data (in order to make the analysis of the data easier, more precise or accurate), and all the tools and technologies (statistical, mathematical, computer, etc.) which are used in analyzing the data.

Marketing issues have been studied, over time, using sophisticated quantitative tools such as mathematical optimization, multivariate statistics, and econometrics, among others (Chintagunta et al, 2016a). These quantitative tools have been used in such marketing areas as market segmentation, media mix optimization (maximization and/or minimization), data-based marketing planning, consumer behavior research and decisions. These have resulted into marketing science and later marketing analytics. The evolution and revolution of marketing science in contemporary times has been a function of new and big data, new approaches to marketing analysis, and new practices and insights, leading to developments in new models for marketing theory and practice. Generally, a model is a representation of key aspects or features of a phenomenon, thing or reality, and a good model needs to simplify and represent reality in order to be reasonably generalizable (Wedel and Kannan, 2016). However, no model represents the exact reality or phenomenon correctly and completely, although some models are useful (Box, 1976). Because of the availability of different kinds of data (small/big, structured/unstructured), in addition to availability of greater computational and analytical tools, plus the need for organizational business managers to make decisions at different times, the need to build different types of business analytic models becomes necessary, especially building business analytics models in the organic business functions different contextual settings, organizations and time periods.

Marketing analytics models are aspects of business analytics models needed to provide insights for marketing management decisions in both profit and nonprofit organizations. Different types of marketing analytics models, including descriptive, diagnostic, predictive and prescriptive marketing analytics models, are needed to produce and provide insights for efficient and effective marketing decisions. Generally, descriptive marketing analytics models deal with data summarization and visualization; diagnostic marketing analytics models attempt to estimate relationships between marketing variables, in addition to testing for hypotheses; predictive marketing analytics models deal with forecast of marketing variables of interest, in addition to simulation of marketing contexts; and prescriptive marketing analytics models deal with determination of optimal degrees of marketing variables (Wedel and Kannan, 2016).

Marketing analytics, though important to various forms of organizations, has many conceptualizations, which may affect its proper comprehension and applications. In addition, there

are many tools that can be used to undertake marketing analytics activities. The tools to be used for marketing analytics in organizations will be a function of the purposes and contexts, in addition to organizational capabilities and associated challenges. This paper conceptualizes marketing analytics, and isolates some of its salient issues such as relationship with big data, tools, applications and challenges. A discussion of marketing analytics with regard to these salient issues of interest has the potential of providing relevant theoretical and practical insights, in addition to stimulating cognate areas for further research efforts.

Conceptualizations of Marketing Analytics

There are forms of equivocations regarding marketing analytics conceptualizations. Marketing analytics can be conceptualized as the scientific process of transforming data into information and insights for making better marketing decisions. It is the application of scientific, mathematical, computer and marketing knowledge and methods to the study and analysis of marketing problems involving complex systems or relationships and variables. It is a branch of business analytics focusing on the collection, management and analysis of relevant data to aid marketing decisions (Hanssens and Pauwels, 2016; McKinsey, 2016). In marketing analytics, data, people, processes, technologies and tools are systematically integrated to generate relevant knowledge and understanding for marketing theories and decisions. Organizations and professionals specializing in marketing analytics produce knowledge in functional marketing issues, measure the lifetime values of customers and clients, and help to generate insights for improving relevant measures of marketing performance (Branda et al., 2018).

Marketing analytics can also be conceptualized as the sourcing, management, and analysis (using descriptive, causal, diagnostic, predictive and prescriptive tools and approaches) of marketing data in order to provide knowledge and understanding regarding marketing practices, strategies, environments and efficiency and effectiveness. It deals with the connections among data (structured and unstructured), relevant technologies and marketing decisions with the purpose of providing insights for achieving efficient and effective decisions in specific marketing contexts. It has benefited from contributions from other cognate disciplines such as computer science, statistics, mathematics, marketing, business management, economics, econometrics, psychology, engineering, operations research, and psychometrics and data science. Therefore, its domain comprises many departments and disciplines, and has an elastic content (Krishen and Petrescu, 2017). In addition, marketing analytics has benefited from the introduction of the World Wide Web in 1995 (Wedel and Kannan, 2016). This is mainly because of the interconnectedness, via information communications technologies, of the entities (customers, clients and marketing analysts and decision makers) that generate and utilize relevant big data. Generally, in the marketing domain, there are interconnections among marketing research, strategic marketing and marketing analytics. Marketing analytics has connections with marketing, decision sciences, operations management, finance, economics, management information system (MIS), and general management (Krishen and Petrescu, 2018), and is an attractive career in the 21st century (Davenport and Patil, 2012). Marketing analytics can be tactical, strategic and time-dependent

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depending on the decision issues being supported, in addition to the type of data and purpose of the analysis (Miles, 2014).

With regard to process, marketing analytics has been conceptualized involve the observation and collection of data about marketing issues and situations, generation of models to represent the marketing issues and situations, and the assessment of marketing policies and strategies, including their relevant impacts, using relevant approaches, technologies and tools (Wedel and Kannan, 2016). The steps in the marketing analytics process are iterative (i.e. backward and forward), where each step benefits from other steps in the process. Generally, the marketing analytics process involves isolating relevant marketing metrics, analyzing the marketing metrics, designing and implementing relevant marketing analytics actions, in addition to evaluating relevant marketing actions based on insights from marketing analytics. Relevant tools are used to undertake the steps and activities in the marketing analytics process.
Presented in figure 1.0 are some of the salient issues of interest in marketing analytics. Discussion of these issues follows.

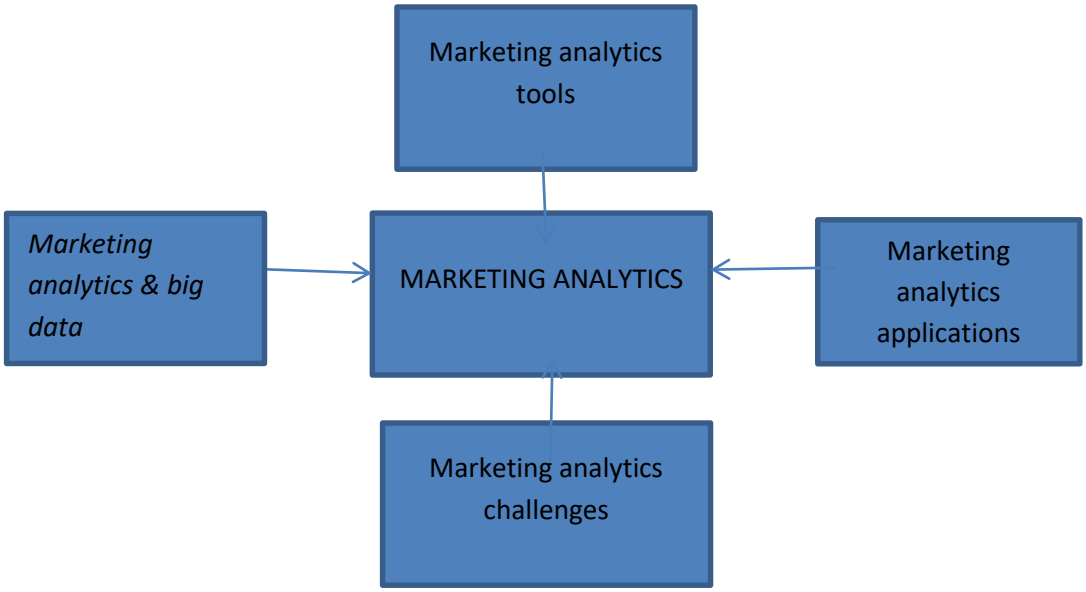

***Figure 1.0: Some salient issues in marketing analytics*.**

Marketing Analytics and Big Data
In contemporary times, huge amounts of data are emanating from many and different sources (Kuo and Kusiak, 2019). About 59 % of world population (which is about 4.54 billion persons) use the internet system (Statista, 2020) and provide huge amounts of data for marketing activities. These huge amounts of data are referred to as big data, and possess such peculiarities that traditional software technologies and tools are unable to collect, warehouse, process and analyze (Mayinka et al., 2011). Also, big data emanate from sensors, digitizers, scanners, numerical modeling, mobile

phones, the internet system, videos, audios and social media networks, among others (Yang et al., 2017). In addition, big data emanate from many and different sources, and can be structured and unstructured, including databases of big companies, mobile apps data, web analytics data, social media data, and internet of things (IoT) data, among others (France and Ghose, 2019).

Big data may be defined as data that is too big or too complex to be processed on a single machine or by traditional analysis, approaches, techniques and tools. They are data whose scale, distribution diversity and velocity require the use of technical architecture, analytics and tools in order to provide insights that reveal hidden knowledge and pattern and create value for decision-making. It is a brand of capital used by an organization to achieve its goals and objectives (Mayer-Schönberger and Cukier, 2013; Erevelles et al., 2016). Generally, big data is characterized by volume, variety, velocity, value, visualization, variability and veracity/accuracy, and these peculiarities have important implications from the perspectives of computing, marketing and analytics (Wedel and Kannan, 2016). Big data include numerical data, text, audio, and video files which are increasingly interrelated, and marketing analytics will benefit from big data by integrating knowledge from cognate disciplines such as data science, machine learning, text-processing, audio-processing, and video-processing (Chintagunta et al, 2016b), including their relevant tools, techniques and methods.

Big data for marketing analytics include data from competitor analysis, customer analysis/customer profiling, segmentation analysis, demographic analysis, and marketing personnel skills analysis, among others. Big data for marketing analytics are also generated by big organizations such as Walmart, Tesco, Amazon, Konga, Jumia, Airtel, MTN, Apple, Visa, Netflix, Google, Facebook, and OK Cupid, among many others. These organizations utilize different forms of marketing analytics tools and approaches for market segmentation, consumer behavior data analysis, and marketing-mix decisions, among others. Therefore, in contemporary marketing environment, marketers need to collect, warehouse, analyze and deploy big data in order to make efficient and effective marketing decisions (Grandhi et al., 2020).

Big data, information and knowledge generated from relevant marketing activities can be meaningfully connected via marketing analytics (Krishen and Petrescu, 2018b). Generally, organizational marketers study the behaviours of their customers and clients (including their needs and wants), design appropriate goods and services to address the needs and wants, and communicate relevant information about the goods and services to the customers and clients (Kang, 2018). Marketers use digital and social media platforms, among others, to generate big data and undertake their marketing activities in order to achieve their marketing objectives efficiently (Ajina, 2019), in addition to altering consumer and client behaviours (Alam et al., 2019). These platforms generate big data for marketing activities, and marketing analytics technologies and tools provide useful understanding and knowledge from the generated big data for efficient and effective marketing decisions (Cao et al, 2019).

In contemporary marketing decisions, big data analytics technologies and tools attempt to draw relevant marketing patterns, inferences and predictions regarding the tendencies of entities, including marketers, customers and clients (Wachter and Mittelstadt, 2019). Via big data analytics technologies and tools, marketers can study customers and clients, target their needs and wants, and serve them efficiently and effectively with appropriate goods and services. In addition, big data analytics technologies are associated with new information practices in the organization, creation of new organizational marketing management decision-making possibilities, and supporting of organizational innovation processes (Niebel et al., 2019), including innovation in marketing practices and processes. However, there are challenges associated with the utilization of marketing analytics in big data (Johnson et al., 2019).

Marketing Analytics Tools

Technological advancements and their associated tools in marketing analytics are altering many dimensions of marketing activities, including customer experience (Flavian et al., 2019). Marketing analytics tools constitute some of the technological tools used by organizations in contemporary times to expose hidden insights (Erevelles et al., 2016; Krishen and Petrescu, 2017). Generally, the landscape of marketing theory and practice has been altered in recent years via social media, digital marketing, big data, and marketing analytics (Moorman, 2016; Verhoef et al, 2016; Iacobucci et al., 2019). In addition, marketing analytics research has been a topical area of interest for some years (Wang and Wang, 2020), and the trends in marketing analytics involve movement from big data (BD) to machine learning (ML), and then to artificial intelligence (AI), including use of robotics in services marketing (Belanche et al., 2020). These trends are impacting on many aspects of organizational marketing activities.

Therefore, marketing analytics is associated with the exploration and quantitative analysis of all available structured and unstructured data, including qualitative and quantitative data, using relevant tools, in order to develop understanding, extract knowledge, and formulate actionable results for marketing decision making. Such data include numerical, textual, audio, and video data, among others. It entails data collection, data cleaning and warehousing (storage), data modeling and analysis, and reporting of results for marketing decision making using relevant technologies and tools. It deals with the use of tools and data (quantitative and qualitative) to answer marketing questions. Using relevant tools, it is an organizational marketing management orientation which can be conceptualized, operationalized, contextualized and tested for the determination of performance impacts (Branda et al., 2018). However, Krishen and Petrescu (2018a) caution that marketing analytics is useless without relevant supporting theories and explanations.

There has been increased interest in marketing analytics over the years (Petrescu and Krishen, 2017). Marketing analytics is a multidisciplinary and inclusive domain that provides data-based insights, using relevant technologies and tools, for marketing theories and practices, including a combination of technologies and tools. Marketing analytics technologies and tools are base platforms and software systems that assist marketers with relevant insights to make evidence-based marketing decisions. They measure marketing activities and provide knowledge and understanding

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for making efficient and effective marketing decisions. There are many technologies and tools for marketing analytics, and these technologies and tools can be used for tactical or strategic marketing decision purposes. The marketing analytics purpose, in addition to available human and non-human resources in the organization, will guide the choice of the marketing analytics technologies and tools.

According to Davenport et al (2019), artificial intelligence (AI) and allied tools and technologies, including machine learning technologies and tools, have the potential of altering marketing theories and strategies, in general, and consumer and client behaviours, in particular. Marketing analytics technologies and tools are generally used for visualization, segmentation and class prediction purposes (France and Ghose, 2019). Some of the tools and technologies for marketing analytics include R, Hadoop, Machine learning, Apache Spark, SPSS, ClickView, Splink (an easy payment platform for customers and clients), Statistical models, Microsoft Excel, Python and Microsoft Azure Studio, among others, in addition to evolving contemporary marketing analytics technologies and tools (Usha, 2000b).

Marketing Analytics Applications

The adoption and application of any form of technological tool, including marketing analytics tool, can be explained using some relevant models such as the unified theory of acceptance and use of technology (UTAUT) and the technology-organization-environment (TOE) models, among others ((Venkatesh et al., 2003; Alshamaila et al., 2013; Effendi et al., 2020). Marketing analytics has become an important technological tool portfolio for organizational marketing decision-makers as a result of advances in technology (Hauser, 2007). According to Chui et al (2018), marketing and sales are the major organic business functions with the greatest application potentials for marketing analytics, including artificial intelligence (AI) and allied technologies and tools. AI tools and technologies can be used to analyze data for marketing decisions (Davenport et al, 2019). Generally, there are many applications of data analytics in marketing (IDG, 2016), including customer behaviour analytics and customer relations management (Mile, 2014). It also has applications in other functional areas of marketing management (such as pricing, product management issues, distribution channel decisions, and marketing promotions, among others), in addition to assessment of marketing environment and performance measurement issues. Marketing performance measures are enhanced via the use of marketing analytics (Cao and Tian, 2020).

Generally, marketing analytics can be utilized in many aspects of marketing activities such as retailing, marketing performance assessment, general marketing management decisions, and customer analytics, among others (Iacobucci et al., 2019). Marketing analytics can also be applied to customer/client generation, prediction of consumer/client behavior, market segmentation, digital marketing, interactive marketing, and marketing promotions, among others (Usha, 2020a). In addition, the marketing mix elements of product and promotion are major marketing management issues in marketing analytics (France and Ghose, 2019). Also, there are marketing analytics applications for optimizing marketing-mix expenditure, personalization of marketing-mix elements to individual customers and clients, relationship management of customers and

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clients, privacy and security of customers and clients (Wedel and Kannan, 2016), and product innovations and brand protection against uncertainties (Johnson et al., 2019).

Customer/client analytics is a major dimension of marketing analytics, which connects big data with consumer and client behaviour issues (Erevelles et al., 2016). It deals with the collection of data, management of data, analysis of data, and strategic use of an organization's data on consumers' and clients' behaviours toward its goods and services. Customer analytics technologies and tools help marketing decisions makers to make sense of mass data from customers and clients (Sathyanarayanan, 2010), and help in bridging any knowledge gap relating to customers and clients (Chaston, 2015). In addition, customer analytics can be applied in the prediction of the behaviours of customers and clients, segmentation of customers and clients, analysis of the needs and wants of customers and clients, and analysis of the life-time values of customers and clients (Bailey et al., 2009). Customer analytics can also be used to analyze determinants of the behaviours of customers and clients towards goods and services, in addition to the impacts of marketing variables on the buying decision processes of customers and clients.

Some other marketing areas for the application of marketing analytics include branding strategy, customer acquisition, customer insight, customer retention, digital marketing, product development, product positioning and promotional strategy (CMO, 2016). In addition, marketing analytics helps marketers to access and relate with their customers and clients efficiently and effectively (Cvitanovic, 2018). According to Petrescu and Krishen (2017), marketing analytics has relevance in customer analytics, big data mining and text mining, social network analytics of customers and clients, market forecasting, and customers' relationship management activities, among others. In addition, marketing analytics can be used for curation of product brand images, identification of specific sales promotion target segments, personalization incentives for organizational customers and clients, and identification of electronic word of mouth (eWOM) marketing communications (Vermeer et al., 2019). Also, marketing analytics has beneficial applications in marketing decisions relating to product development, advertising, distribution, retailing, marketing research and intelligence (Hair, 2007). Alijumah et al (2021) posit, with empirical evidence, that the success of new product development is partly a function of proper utilization of marketing analytics. However, Xavier et al (2011) argue that marketing analytics applications are ambiguous.

Marketing Analytics Challenges.

Marketing analytics practices, technologies and tools, generally, are associated with challenges and opportunities. Krishen and Petrescu (2018) lament that the equivocation in the conceptualizations and scope of marketing analytics has created challenges for relevant theorists, researchers and practitioners. Also, Metz (2018) posits that some data analytics technologies and tools, including artificial intelligence technologies and tools, are generally problematic. Some of the challenges confronting data analytics technologies and tools relate to data privacy, biases in software algorithms and ethical considerations (Larson, 2019). According to IDG (2016), the major challenges confronting marketing analytics include finding relationships among different

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sources of data, estimating or predicting sales of goods or services, and predicting customer or client behaviour, among others. Also, the privacy concerns of customers and clients constitute some of the challenges associated with marketing analytics. In addition, big data issues relating to data outliers and impurities can pollute marketing analytics activities, and impact negatively on associated marketing decisions.

Some other challenges associated with marketing analytics in an organization relate to lack of relevant organizational direction with regard to marketing analytics, lack of organizational personnel with requisite skills and expertise, lack of appropriate marketing analytics technologies and tools, and lack of supportive organizational culture for marketing analytics practices and strategies. In addition, there are challenges relating to the integration of various forms of data for marketing analytics and decisions (Hanssens and Pauwels, 2016; Iacobucci et al., 2019), analysis of data generally (Verhoef et al., 2016), and lack of validated measurement scales for the assessment of marketing analytics applications and tools in organizations. Also, many marketing organizations seem not to have adequate knowledge, understanding and utilization of contemporary marketing analytics tools and technologies (Duan et al., 2019; Miklosik et al., 2019). In addition, although data analytics tools (which include predictive analytics, data mining analytics, case-based reasoning analytics, exploratory data analytics, business intelligence analytics, and machine learning tools, among others) exist (Tan et al., 2017), Wong (2012) laments that data analytics tools to handle unstructured big data seem to be lacking or inadequate. In addition, there is lack of adequate marketing analytics tools and technologies for marketing decision-makers, researchers and practitioners to benefit from the huge potentials of big data (Tan and Zhan, 2017), especially in developing economies and among small business enterprises (SMEs). Also, big data marketing analytics is associated with some challenges relating to mining, storage, transportation, and processing (Yang et al., 2017), in addition to lack of organizational capabilities required for the utilization of marketing analytics for marketing activities (Rahman et al., 2021), including social media analytics capability for marketing decisions (Wang et al., 2020). However, some of these challenges are surmountable. For instance, data quality challenges of marketing analytics can be addressed via the use of large volumes of purified or cleaned data, in addition to the use of data outlier detection methodologies and tools (Hodge and Austin, 2004; France and Ghose, 2019). Also, some machine learning (ML) technologies and tools, appropriate government regulations, in addition to organizational development programmes, can be used to address some of the challenges confronting marketing analytics.

CONCLUSION AND RESEARCH AGENDA

This paper has attempted to examine marketing analytics from the lens of its conceptualizations, relationships to big data, tools, applications and challenges. There seems to be lack of agreement in relevant theoretical and practical domains of marketing analytics. Therefore, it can be concluded that marketing analytics, though important to organizations, has equivocal conceptualizations. In addition, there are many contemporary and emerging technologies and tools that can be used to undertake marketing analytics activities, and these will be a function of the marketing analytics

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purposes and contextual factors, in addition to human and non-human resources available to the organization. Also, marketing analytics are associated with some challenges.

The insights from this paper are likely to spur research in cognate issues. Specifically, each dimension or issue in Figure 1.0 is a likely fertile candidate for further research. With regard to conceptualizations of marketing analytics, it is proposed that further research be undertaken regarding executive conceptualizations of marketing analytics in various organizations in different industrial sectors in developed and developing economies. An understanding of marketing analytics conceptualization will assist its proper applications, in addition to highlighting the boundaries of its domain (Belanche et al., 2020). Also, empirical research, using validated scales, is suggested regarding the marketing analytics tools used by marketing decision-makers in different organizational, contextual and cultural settings. In addition, cognate empirical research is suggested regarding the challenges confronting marketing analytics practices and strategies in different organizational, contextual and cultural settings. Such studies will go a long way in providing further insights for understanding and expanding the frontiers of marketing analytics theory and practice. Also, since the scope of marketing is wide, it is suggested that further research be undertaken to explore and expose the many applications of marketing analytics in various spheres of marketing. Many factors can affect the utilization of marketing analytics, including types of business, among others (Cao et al., 2021).

In addition, based on the challenges isolated in this paper, future research could examine the extent to which data privacy, biases in software algorithms, lack of relevant resource endowments, and ethical considerations, among others, pose as challenges. In this vein, comparing organizations operating in different business contexts (such as companies in goods versus services businesses, companies in developed versus developing countries; small versus large business organizations, among others) in relation to these challenges is likely to provide relevant theoretical and practical insights.

Therefore, in the context of this paper, the following general research questions may guide future empirical research efforts:

1. What are executive conceptualizations of marketing analytics in different organizations?
2. What are the marketing analytics tools used by organizations in different contextual settings?
3. What are the challenges confronting organizations in the utilization of marketing analytics?
4. What are the relative functional emphases of organizations in the use of marketing analytics for different marketing activities?
5. What is the role of big data in the utilization of marketing analytics in organizations?

These proposed lines of research and broad research questions are likely to help clarify some relevant issues in marketing analytics, expand the frontiers of its knowledge and assist organizational decision-makers with regard to the conceptualizations, tools, applications, role of big data, and challenges associated with marketing analytics in various organizational contexts.

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Finally, it has to be stated that the issues presented in Figure 1.0 may not be comprehensive enough to accommodate all the cognate issues associated with marketing analytics in all contextual settings. This is a major limitation of this paper which can be addressed in future research efforts.

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