Information Sciences Letters
An International Journal

http://dx.doi.org/10.18576/isl/120414

Big Data Analytics Impact on Marketing Digital Transformation

M. Medhat [1,2,*] *and W. A. Bayomy*[3]

[1]College of Mass Communication, Ajman University, Ajman. UAE
[2]Art & Design Academy, Higher Institution of Applied art, 6th of October, Cairo, Egypt
[3]First Abu Dhabi Bank FAB, Abu Dhabi, UAE

Received: 22 Nov. 2022, Revised: 22 Dec. 2022, Accepted: 21 Jan. 2023.
Published online: 1 Apr. 2023.

Abstract: The study aimed at evaluating the applications of big data analytics in enhancing the transformation of the global economy. The sample for this study consisted of consultants who are familiar with big data and transformation in marketing. A total of 396 consultants were sent the study questionnaire to participate in the online survey, of which 118 participants commenced the survey. Companies need such input because only half of them create business events and only a quarter calculate key performance indicators such as profitability. One can only wonder whether there is in fact a wide demand for this classification. From a realistic point of view, it may not matter whether the change is radical or transformative, the real impact is more important. Furthermore, the anticipated increase in post-purchase boost is in line with previous studies which mention that companies can offer precise customer service using the new interface. Findings are not astounding as we see such modifications taking place. The popularity of mobile and social applications facilitates customers to access product and service information in a variety of ways when needed, which further augments their product and service awareness. This study shows increased expectations for the use of automation and self-service communication between institutions and customers. The results assured that businesses need such input to be a starting point for firms to verify their business issues.

Keywords: Advertisement Marketing, Big Data Analytics, Digital Transformation.

1 Introduction

In today's digital era, business organizations, governments, and corporations have to collect vast volumes of data to guide their decisions. The data gathered is usually enormous, which remains of no use without proper use to identify trends, and patterns and draw information from the data [1]. In today's digital era, every organization has data that must be used to determine its decisions and align with the global trends in the digital transformation. Economics of data, digital transformation, and analytics are critical components of modern day global economic decisions in all spheres of development [2]. Data-driven decisions are certain in every organization in modern day market performance particularly in healthcare, manufacturing, retail, and public sector administration. It is becoming increasingly common for production technology or information-related organizations to utilize artificial intelligence or to look for artificial intelligence companies that will become partners. Because artificial intelligence can replace the need for hard work, which can take a long time to complete, it can assist people in working easier or shortening their working hours. As a result, artificial intelligence also plays an important role in digital marketing and in market analysis, which will benefit the marketing industry [3].

As the story goes, big data enables market participants to create great value. But is big data always the answer to more efficient communication? [4] argued, minimal data "is so important to people, it is these tiny little spoons that we take out whenever we search, chat, listen, buy or do anything else online". Likewise, [5] recommends little data - first-hand observations of nightclubs, sports clubs, driving or phone calls at consumer homes, in restaurants. These seemingly trivial and seemingly insignificant observations, once linked, tend to identify important causal relationships that Big Data has not known to date. In Medallion, it's a big question mark to customize the marketing process using the aforementioned technology to process big or small data: consumer privacy. In this context, the privacy impact of the data collected must also be acknowledged. The EU General Data Protection Regulation (GDPR), which enters into force on 25 May 2018, also applies to companies outside the EU. All companies that process EU business, population or citizen data must comply with the GDPR. As Eric Schmidt, CEO of Google Alphabet, explain [6]: "Big data has become a reality. The computers we use every day are collecting this data. This leads to a certain question, who is using this data and why?" For fear of data collection and exploitation, some people choose not to use personal information to

*Corresponding author e-mail: d.mervatmedhat@gmail.com

pay for seemingly free services.

Current research shows that marketing departments understand the BDA analytical environment in evolution through critical reasoning behavior. Organizational commitment to new technologies usually leads to many consequences irrespective of apparent understanding of the ultimate advantages of technology [7]. These studies show that numerous marketing companies find the growth of change unstoppable and lack a deep comprehension of the resources and skill set encompassed in becoming a completely data-driven organization. Considering these insights, it is no doubt that advertising marketing has become a field of experiments from the beginning with BD approaches [8]. For example, Starbucks uses big data to determine the perfect location and potential success for its new store location, by collecting its customer information and putting their behavior into account. BD helps Starbucks predict its success rate toward its revenue growth. A massive effect has been observed from loads of data such as mobile applications and social media, which directly influence brand development [9].

Like previous new media revolutions, the introduction of the BDA will involve extensive discussion for some time and actions after perception before clarity emerges [10]. While executives are convinced that BDA is important for future competitiveness, many in the early stages are indeterminate regarding technology and equipment that will continue to be relevant and therefore uncertain about where to bet. While other theoretical approaches, such as the absorption capacity of technological adaptations and organizational practices, are considered to have potential implications for explaining BDA implementation, the complex and rapidly changing nature of the phenomenon makes sensible theories promising [11]. Meaning building explains how people understand vague situations back in time through actions and words. The purpose of this study is to explain the progress of marketing departments in the introduction of big data analytics capabilities.

The study aimed at evaluating the applications of big data analytics in enhancing transformation of the global economy. To meet the aim of the study, the following objectives were developed:

1) To understand the concepts of big data analytics.
2) To evaluate the areas of application of big data analytics in digital transformation and advertisement marketing.
3) To evaluate ways big data analytics would result in the growth and development of the advertisement marketing sector.

2 Research Question

The research aimed at using a research question to guide the purpose and objectives of the study. The research questions aligned to connecting the big data analytics to transformation of the global economy. The study aims at answering the research question: What is the role of big data analytics in enhancing transformation of the global economy?

3 Literature Overview

3.1 Understanding Big Data Analytics

Big data refers to large volume of data collected by organizations on daily basis [1]. From the researchers view, big data must have characteristics such as variety, sheer volume, and complexity that make it harder to process it using the traditional methods of data analysis. This means that big data cannot be analyzed using the traditional methods due to its large volume and variety. As a result, big data requires new approaches to process the data and make meaning information for guiding decisions in the advertisement market [2]. From big data analytics, organizations can make useful meaning of extracted data to enhance their decision-making. Analysis of big data contributes to the identification of patterns and trends that help make production, marketing, design, and customer perception approaches to grow the performance of an organization [2]. This translation of the large volumes of data is called big data analytics, which is required to guide management decisions for an organization to be considered as digital transformation.

3.2 Big Data Analytics as a Factor of Production

Recently, scholars have demonstrated significant improvement in big data analytics. Evaluating the amount of data that can be stored in real-life indicates significant volumes of data for the improvement of health outcomes. In a report by the [12], it was identified that significant volume of data is produced by companies on daily basis, which cannot be useful without effective approaches to interpret trends and patterns. Big data has a critical role in economic development and production practices in organizations. Just like other factors of production in economics like hard assets and human capital, no significant growth can occur in an organization without meaningful use of data to influence decisions. Findings in the report by [13] estimated that over 200 terabytes of stored data in the United States

in 2009 was produced per company that had more than 1,000 employees. From the same report, it was identified that most of the sectors reported 1 petabyte in mean stored data per company.

It has been observed that powerful data visualization tools have been constructed for understanding data in a more cohesive approach and to offer sense to this exponentially increasing data [14]. Data scientists are asked by firms to work with this massive data quantity as investigating data is shaky and complicated. In general, firms make most of their daily decisions by repetition based on common practice or experience. Big data are modifying the decision-making procedure of the firm based on a competitive asset for enhancing the firm's performance [15]. Such modifications are diversifying the firm and the repartition of powers within the firm.

In the European Union market, over 70% of the corporations have significant capacity to store and process data for guiding decisions. Findings from [12] study identified that Europe has a significant capacity to process and manipulate big data, which is lower in other regions across the world. From the findings, it is clear that countries, corporations, and businesses that have significant capacity to process and manipulate big data are able to perform better in the markets and economic development is likely to occur due to data-based solutions. In other areas such as Asia, the study identified that there are over 800 million devices in China alone that are useful in collection of personal location data [16]. Capabilities to process big data continues to evolve and influence decisions as a factor of production for significant developments in innovation and technological platforms for enhancing handling and process of data on customer behavior and prospects for use in the production practices.

3.3 Big Data as a Key Basis for Competition and Growth of Individual Firms

Big data analytics is a key in driving competitiveness and growth of firms across the world. In a report by [16], it was identified that retailers are embracing the concepts of big data to increase their operating margins by an additional 60% of the current production capacity. An example is Tesco, which is using big data analytics to capture its market share and overcome high competition (Liu et al., 2020). Other areas that are impacted by big data analytics include insurance and financial services to enhance global trade and economic development. Forward-thinking businesses are aggressively using big data capabilities to drive performance to a higher outcome [17]. Competitors can be overcome by gaining capabilities to improve on product performance, marketing and engagement with consumers, which require a best practices in management of big data.

According to [18], BD is not a large repository for large databases. Instead, it focuses more on the ability to access, analyze and utilize real-time information to provide real intelligence and business benefits. Companies use BD technology to monitor information flow, analyze large amounts of data, and quickly tailor responses based on specific, unique and customized knowledge, and exchange data and information with customers and other stakeholders [19]. It enables companies to integrate and collect data resources with different structures and multiple forms from complex distributed systems. Data is often refined and filtered through advanced, highly complex and cost-effective customer analysis and transformed into customer insight that is useful for marketing and service decisions [20]. Marketing teams can benefit from BD environments to ensure effective and efficient communication and dissemination of knowledge.

In addition, BD enhances comprehension of data-driven marketing and offers executives with dynamic learning abilities for stimulating the marketing process development and protect brands from dynamic risks. There are numerous organizations that are using BD, including Amazon, American Express, BDO, Capital One, General Electric, MiniClip, Netflix, Next Big Sound, Starbucks, and T-Mobile [21].

BD is not only about data collection, but also takes into account other equally important variables, including the time and location of the data, which makes for more accurate analysis and real-time marketing strategy decisions. For example, some IT firms continue to provide big data analytics (BDA) and smart technology services to enable companies to develop valuable consumer insights to support management and market-making decisions. Businesses can utilize BD for comprehending environmental assessment, deteriorate doubt, and make informed decisions.

3.4 Organizing Real-Time Decision Making

[22] say that firms with BD insight can be more responsive, flexible, and highly reactive to business requirements and unforeseen likelihoods. The competence for extracting insights from data is valuable for exposing numerous erroneous trends. BD text analysis tools provide the opportunity to recognize key trends and other important information and knowledge from large amounts of organized and unorganized data that might otherwise be complicated to track. [15] claim that the BDA can assist companies, collect immediate responses from consumers, monitor changes in customer behavior, and disseminate this information to product development teams. The knowledge generated through the BD process can serve to plan, design and improve companies' marketing strategies. Likewise, companies can get more information and learn more about the main product characteristics of competitors, pricing policies and customer feedback.

BD's generating capacity enables companies to maximize pricing decisions based on customer spending behavior, create new value and comprehend possible risks and how to reduce them. The ability to implement real-time is facilitated by the application of BD technologies including web analytics, customer analytics, search engine crawling and search analytics, which enable marketers to gain automated knowledge sets about the behavioral characteristics of their consumers. The vast majority of BDA systems provide both descriptive and predictive information, enabling companies to spot different patterns quickly which can be very helpful in decision-making.

The main task of these methods is to eradicate important and inappropriate data so that useful preferences can be drawn. That is, BD can cover latent knowledge, create new understanding, and construct greater adaptability as compared to companies with minimal awareness and information requirements. To confirm this development, [23] showed that BD technology can enhance hoteliers' understanding of customer satisfaction, loyalty and auditing intentions. As such, BD facilitates firms to acquire a higher level of understanding to comprehend the dimensions of the environment, perceive likely market opportunities and risks and achieve outstanding business skills.

3.5 Uses of Big Data in Marketing

Companies can extract real-time information about customer perception, product evaluation and advice. Likewise, BD enables companies to manage this information in a powerful way in customer-company associations and ensure powerful and real-time personal service. Custom knowledge gained through BD applications can be used to track customer behavior data. When these data are combined with traditional market research, they can be inferred to portray the micro-segment of the market and help to create highly targeted groups for personal pricing and advertising. In addition, companies using BD for real-time consumer insights can increase their understanding of unmet consumer requirements. Businesses can then translate this insight into activities to enhance the effectiveness of digital advertising while improving the powerful capabilities of the agency.

BD offers retailers the opportunity to apply marketing measures and achieve greater profitability from market investment through targeted marketing measures. Incorporating BD into personal marketing creates the conditions for increased control over the process and great satisfaction and initiative for the customer experience. An interactive approach driven by BD can create more customer value, increase agility and encourage flexible product design and production processes. Most of biggest online, on-demand TV shows and movies platform use BD to create such good customer experience. BD is used to create personalized accounts for each consumer, they collect their consumer watching habits data during their watching time. Netflix uses this data to create a personalized panel and even more personalized movie trailers using Artificial intelligence as they plan.

BD facilitates the transfer of information from customers to manufacturers to assess target markets and introduce new products with the best custom level. A company's ability to gain a holistic view of the customer will ensure that the final product exactly meets the customer's requirements. BD has led the rise of specialty companies that focus on delivering custom products and marketing materials and improving financial performance by investing heavily in custom methods.

3.6 Big Data Application in Consumer Surplus and Productivity Growth

Big data analytics is playing a critical role in building higher productivity growth and consumer surplus in production processes. By increasing the value-addition and product satisfaction level of consumers, the increased adoption of big data is creating new opportunities for improving efficiency. However, these practices are reducing the overall cost of production that is declining significantly. For instance, [24] identified that big data analytics is enabling companies to leverage its capability to improve product quality and satisfaction level.

Recently, big data analytics has become a fundamental enabler of performance in the pharmaceutical and biotechnology to accelerate new drugs development, testing efficacy of mediations, and advance the understanding of drug interaction and metabolism [24]. Increased production is common in the current environment for business and increasing the production efficiency that are beneficial to economic developmental and financial performance of firms. In other areas, big data analytics is improving health outcomes, resulting in higher-quality services in the public sector. All these benefits influence economic growth and development across the world.

4 Research Gap

The purpose of the study was to investigate the potential benefits associated with big data analytics particularly in supporting transformation of global economies. The analysis focused on various sectors that are highly impacted by big data analytics such as advertisement marketing, public sector administration, healthcare, retail, and personal location data. These areas have been found to be highly influenced by big data commitments particularly in increasing performance and growth. To realize the best outcomes, companies, and governments will benefit from big data analytics. Use of big data has the potential to significantly create value in each of the industry sectors through big data

to improve coordination and allocation of human and physical resources for driving performance and maximizing profits.

5 Methodology

The data were collected through an automated online survey, and participants corresponded via email. The email explained the significance of completing the survey. The first answer was promptly after the survey was distributed and the second was after four days reminder. The target group of this study is marketing consultants. As demonstrated, marketing consultants are selected because they are undoubtedly the most informative group when it comes to implementing big data and consequently identifying its impact on the organization. The sample for this study encompasses of consultants who are familiar with big data and transformation in marketing. In view of the time and openness restrictions, no other marketing consultants were involved, which makes this example convenient.

Therefore, it is complicated to identify whether the results of this sample can be widespread across the population. Participants must be competent enough to analyze and monitor all the impact of big data marketing projects in the company. For controlling the extent of knowledge about big data marketing, a question was included where participants could indicate their knowledge of the subject. Target interviewees were found through an internal staff database and included all senior management consultants.

A total of 396 consultants were sent questionnaire to participate in the online survey, of which 118 participants commenced the survey. 56 participants responded to the questionnaire after the preliminary request and 35 responded to a reminder after four days. Of the 118 participants, 1 was removed due to lack of knowledge about big data marketing and 10 were removed for the sole purpose of providing contact information. Of the remaining 97 respondents, 3 were ineligible to participate, one respondent answered "4" to all questions and their case was removed. Of the remaining 93, 73 answered the entire questionnaire and 20 answered the questionnaire in part. Those who partially answered the questionnaire were not taken from the final sample as part of the survey data was available.

6 Instrument

The organization has 3 to 16 different indicators of change. These indications for change are based on marketing activities. The survey was pre-tested with five respondents in the sample to examine the clarity and coherence of measures and questions. No major issues were identified, so the study remained unchanged.

Participants were inquired to mention on the symmetry of the 7-point Likert scale how big data marketing will affect their organization. Only extreme values are given to ensure the greatest possible probability that the answer possibilities are evenly distributed, which makes it possible to process data at an intermediate level. The 7-point scale was selected as it is the best division between the time required to complete the survey and the reliability of the data, while preserving the neutral response potential. In order to provide the respondents with a relevant context, a definition of big data marketing was presented. This explanation is an internal conceptualized used in the chosen organization.

Internal resources were purposely given rather than that used in the dissertation, as respondents were more likely to relate more to the internal definition and - if a different definition were given - would probably still base their answers on the internal definition of big data marketing. There are two main differences between the internal definition and the definition of big data marketing in this article. Internal resources do not specify which digital technologies lead big data marketing, which may lead participants to consider the survey with other digital technologies. While this is a likely risk to the validity of the study, the likelihood of it happening is relatively small because the same technology is implicitly required by internal definition. A bigger threat is the difference in transformation. In the inner definition, nothing is tied to the transformation. Participants applied their own philosophy of transformation, which could not fit the transformation classification theory of [25]. Therefore, digital technology modifications can be classified as transformative, while they are not. This could reduce the validity of the study by including less effective changes and thus diluting the results. Therefore, the results of the survey may not be relevant, or to a slighter level. A value proposition shows a series of products and services that a company provides to a particular customer segment. Interviewees were inquired to mention how the service and availability of an organization might change because of big data marketing instead of the existing state of goods and services. This modification is estimated on a 7-point Likert scale.

Customer groups represent different groups of customers that a company can recognize and serve. The division of customers relies on pre-requisites, attitude and characteristics. Participants were enquired for indicating how changes of big data marketing would lead to identifying and adapting to changes in customer needs, characteristics and behaviors, and overall market segmentation. This modification is estimated on a 7-point Likert scale.

Channels represent how a company interacts with and encourages customers to come up with a value proposition. Respondents were asked to describe how five channel measurements will change due to big data marketing. This change is measured on a 7-point Likert scale.

Key resources reflect assets needed throughout a firm. Participants were enquired to describe how resource utilization will modify because of big data marketing. This modification is estimated on a 7-point Likert scale.

Key partners represent a cluster of suppliers and partners that enable the firm to function properly. Participants were enquired to mention whether the number and relationship of major partners will change due to big data marketing. Revenue flow represents how a company receives cash from customers. Respondents were asked to indicate whether each type of income generation occurs more or less frequently due to big data marketing.

Cost planning represents start-up costs for companies. Participants were enquired to describe how predefined, altered, and total costs will change due to big data marketing.

7 Sampling technique

The sampling technique refers to the assortment of a small share of social performers from the whole population to conclude the findings and outcomes as a whole. There are primarily two comprehensive categories of sampling techniques consisting of probability sampling and non-probability sampling, [26] Convenience sampling in social sciences is one of the commonly used in non-probability sampling techniques. It denotes to the assortment of the sample of participants from the target population on the basis of utmost acquiring accurate and appropriate knowledge to the study domain which are easily available for data collection procedures. Tables (1) Pilot test and (2) Descriptive Statistics shows, how convenience sampling technique has been used.

8 Analysis and Result

Table 1: Pilot test

Variable name	Items	Cronbach Alpha
Internal values	6	0.856
Customer groups	5	0.841
Marketing channels	4	0.700
Key resources	3	0.745
Key partners	3	0.879
Cost planning	3	0.772
Big data marketing	5	0.634

9 Descriptive Statistics

Table 2: Descriptive Statistics

		Frequency	Percent
Gender	Male	254	71.8
	Female	100	28.2
Age group	18 years to 27 years	72	20.3
	28 years to 37 years	169	47.7
	38 years to 47 years	72	20.3
	48 years or above	41	11.6
Income	Below 25000	42	11.9
	26000-50000	140	39.5
	51000-75000	117	33.1
	Above 75000	55	15.5
Education	Undergraduate	55	15.5
	Graduate	283	79.9
	Post-graduate	16	4.5

10 Exploratory Factor Analysis (CFA)

The results of exploratory factor analysis are presented in the following two tables. KMO and Bartlett test is presented in Table (3).

Table 3: KMO and Bartlett's Test

KMO measure of sampling adequacy		0.831
	Approx. Chi-square	5582.085
Bartlett's test of sphericity	Df	300
	Sig.	0.000

It has been observed that KMO measure must be greater than 80% whereas Bartlett's test of sphericity must be statistically significant at 1% confidence interval. In this regard, it can be examined that the requirements for both the tests are fulfilled based on factor analysis. Table (4) shows Rotated Component Matrix.

Table 4: Rotated Component Matrix

Items	Component						
	1	*2*	*3*	*4*	*5*	*6*	*7*
IMAGE3	0.91						
IMAGE2	0.90						
IMGAG4	0.89						
IMAGE5	0.88						
IMAGE1	0.80						
LOVE4		0.90					
LOVE3		0.89					
LOVE2		0.87					
LOVE5		0.70					
LOVE1		0.65					
TRUST3			0.81				
TRUST1			0.80				
TRUST2			0.78				
TRUST4			0.72				
IE2				0.86			
IE1				0.85			
IE3				0.72			
BE2					0.81		
BE3					0.78		
BE1					0.78		
SE2						0.79	
SE3						0.76	
SE1						0.70	
BL1							0.89
BL3							0.85
Total	4.25	3.39	2.62	2.36	2.14	1.82	1.78
% of Variance	16.98	13.57	10.49	9.44	8.58	7.28	7.11
Cumulative %	16.98	30.55	41.04	50.48	59.06	66.35	73.46

Similarly, it has been noted that both the factor analysis and total variance must be greater than 60%. In this regard, the aforementioned findings indicate that both estimates fulfill the standard benchmark of 60%. Table (5) shows Model- Fit Indices.

Table 5: Model- Fit Indices

Model Index	Threshold	CFA	SEM
Chi-Square (CMIN/DF)	< 3.00	1.728	2.098
Goodness-of-Fit Index (GFI)	> 0.90	0.922	0.901
Adjusted GFI	> 0.85	0.897	0.874
Comparative Fit Index (CFI)	> 0.90	0.970	0.954
Normative Fit Index (NFI)	> 0.90	0.933	0.915
Tucker-Lewis Index (TLI)	> 0.90	0.964	0.946
Root Mean Square Error Approximation (RMSEA)	< 0.08	0.045	0.056

In the aforementioned table, the fit indices should be 85% for AGFI. It has been apparently observed that all the fit indices were accomplished in both the CFA and SEM frameworks. Therefore, validity of the frameworks is approved with respect to the model fitness support. Table (6) presents the validity for factor loadings based on all the items and factors at 5%.

Table 6: Construct Validity

Construct	Estimate	P Value
Internal Values	0.966	0
	0.95	0

	0.943	0
	0.925	0
	0.655	0
Customer Groups	0.899	0
	0.909	0
	0.822	0
	0.594	0
	0.701	0
Marketing Channels	0.799	0
	0.726	0
	0.638	0
Key Resources	0.884	0
	0.792	0
	0.634	0
Key Partners	0.675	0
	0.625	0
	0.865	0
Cost Planning	0.883	0
	0.661	0
Big Data Marketing	0.843	0
	1.002	0

From the findings, it has been observed that the criteria of significant level are fulfilled for the factor loading of construct items. Thereby, the findings have accomplished construct validity of the all the encompassed variables, which exclude customer groups. The level of correlation among the measurement items is defined as convergent validity. This concept relies on boosting inter-related theoretical estimates, which are statistically correlated. Table (7) presents the findings of AVE, composite reliability, and Cronbach's Alpha reliability as the criteria for measuring convergent validity.

Table 7: Convergent Validity

Construct	**Composite Reliability**	**Average Variance Extracted (AVE)**
Internal Values	0.952	0.802
Customer Groups	0.886	0.665
Marketing Chammels	0.809	0.516
Key Resources	0.817	0.603
Key Partners	0.769	0.531
Cost Planning	0.753	0.608
Big Data Marketing	0.923	0.857

As shown in Table (7), convergent validity results indicate a threshold value of 0.50 for Average Variance Extracted (AVE) and 0.70 for composite reliability [27]. Consequently, the degree of convergence has been statistically proven and reliable as well. Following table (8) shows results of path analysis for hypotheses-testing.

Table 8: Hypotheses-Testing using Path Analysis

Pathways			**Estimate**	**S.E.**	**T-Stats**	**P-Value**
Marketing Channels	→	Big Data Marketing	0.003	0.052	0.057	0.955
Internal Values	→	Big Data Marketing	0.102	0.052	1.947	0.052
Customer Groups	→	Big Data Marketing	0.126	0.074	1.699	0.089
Key Resources	→	Big Data Marketing	0.139	0.037	3.797	0.000
Key Partners	→	Big Data Marketing	0.032	0.055	0.581	0.561
Cost Planning	→	Big Data Marketing	0.297	0.034	8.645	0.000

The results have shown that cost planning has positively significant relationship with marketing channel (0.102, $p < 0.10$) and internal values (0.126, $p < 0.10$) but statistically insignificant relationship with customer groups (0.003, $p > 0.10$). Furthermore, key resources include statistically significant and positive relationship with marketing channel (0.158, $p < 0.10$) and internal values (0.356, $p < 0.10$) but insignificant relationship with customer groups (0.020, $p >$

0.10). However, key partners have significantly positive relationship with customer groups (0.248, $p < 0.10$), marketing channel (0.246, $p < 0.10$) and internal values (0.732, $p < 0.10$). Lastly, customer groups (0.139, $p < 0.10$) and internal values (0.297, $p < 0.10$) have statistically significant and positive relationship with big data marketing but marketing channel (0.032, $p > 0.10$) has positively insignificant relationship with big data marketing.

11 Discussion and Conclusions

The purpose of this study is to determine the effect of big data marketing on a digital transformation. Research on this effect is needed, as no research to date has described the impacts of big data marketing on all attributes of the organization and across industries. Previous research has focused only on specific factors, one industry or one intrinsic technology. In addition, the results of this study can be a starting point for firms to verify their business issues. Companies need such input because only half of them create business events and only a quarter calculate key performance indicators such as profitability.

In the near future, it is possible and likely that there will be a new wave of digital technology that will drive big data marketing. Therefore necessary to modify the digital technology covered by big data marketing as well as to alter the conceptualization of big data marketing. Also like [25] pointed out that their proposed dimension and impact criteria could be controversial. One can only wonder whether there is in fact a wide demand for this classification. From a realistic point of view, it may not matter whether the change is radical or transformative, the real impact is more important.

Big data marketing is anticipated to transform companies in numerous areas, with digital transformations having approximately one component that is anticipated to undergo moderate or even cohesive changes. The major effect will be on the company's value proposition, the customer group they can recognize and serve how the company reaches users and the resources they utilize.

In addition, these studies show that companies are expected to offer more ways to deliver and support customers after sales. These results are consistent with the results of many previous studies. For example, [28] Observed that customers are increasingly buying online as their digital potential is enhanced. [29] identified that institutions utilize different digital channels and [30] concluded that such channels provide institutions with new approaches to offer their products. Furthermore, the anticipated increase in post-purchase boost is in line with previous studies which mention that companies can offer precise customer service using the new interface. The findings are not astounding as we see such modifications taking place. The popularity of mobile and social applications facilitates customers to access product and service information in a variety of ways when needed, which further augments their product and service awareness.

Recently, there is a rise in approaches of purchasing goods and services; from PayPal and Ideal to new offers like Samsung and Apple Pay. Many fintech companies are now working on financial payment solutions that will expand the ways and means of purchasing products and services. The results of this study indicate increased expectations for the use of automation and self-service communication between institutions and customers. These results are consistent with the studies who pointed out that automatic self-service is progressively activated using digitalization and participation and digital platforms. Furthermore, the results show that communication through co-creation and society is expected to increase, which is in line with previous research by [31] cite digitalization as a factor in this growth. Furthermore, this study shows that no changes are expected in the use of personal assistance.

Previous studies pointed out that due to digital integration within institutions, operational processes are becoming more standardized. As the results are purely research methods, it is not possible to state the reasons for the discrepancies in the results. From the point of view of integration, the results indicate that greater integration is expected in all key activities. This study shows that the utilization of physical resources is anticipated to decrease whereas the expected utilization of intellectual resources increases. We can already monitor these findings in the agency's current resource use. The growing popularity of cloud-based services reduces the need for permanent on-premises IT infrastructure.

The results of this study confirm the current change in the ecosystems we are monitoring. Digital technology enables companies to deliver new and improved products and services to their customers. Institutions often need more partners because they have neither the capacity nor the expertise to use this technology. In addition, inter-agency ecosystems need to become increasingly dense, as seamless integration is essential to deliver a consistent customer experience anytime, anywhere.

The results indicate that the use of asset sales as an income method is not expected to change, which is in line with [29] who did not see a significant change in asset sales. In addition, respondents to the survey expect that the use of fees and licenses will increase, as licenses and new types for each use are becoming more popular. The results also show that the use of advertising is expected to increase, which is in line with [29]'s observations that this will increase due to an increased online presence. A research result that does not fit [29] is the expected growth in rent. [29] sees no significant

change in such income. Finally, the study shows that the use of subscription fees is also expected to increase. This is a logical conclusion as the number of online customers and the use of advertising is increasing.

12 Implications

As a team, marketing organizations need to obtain BDA tools, technology and resource capabilities and extrapolate how best to integrate them in their advertisement marketing to create insight. This study recommends that BDA staff reduce segregation from other marketing departments and rather stimulate advertisement marketing by educating colleagues on the principles of analysis and examining common use cases. The findings question the feasibility of central business analysis until a company's operations transform its approach to data-driven decision-making. We recommend that managers analyze the types of new data and analytical methods in order to gain a systematic understanding of their direct connection with advertisement marketing. Early success and immediate impact on the quality of transparency could be overlooked if intelligence gathering is only considered investigative. We propose a working group whose role is to identify and implement technologies to improve market insight capabilities. Our results suggest that the role of senior executives in making the marketing department more data-driven is driven by the rational process and increased influence of BDA technicians. Management enables this, drives the process but does not drag the labeling department towards data-driven marketing.

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

References

[1] Márquez, A. C., & Ruiz Usano, R., Global production: a handbook for strategy and implementation, edited by E. Abele, T. Meyer, U. Näher, G. Strube and R. Sykes (2009).

[2] Niebel, T., Rasel, F., & Viete, S.,BIG data–BIG gains? Understanding the link between big data analytics and innovation. Economics of Innovation and New Technology, Volume 28, Issue 3, 296-316 (2019).

[3] Shabbir, J., & Anwer, T., Artificial Intelligence and its Role in Near Future,Volume 14, Issue (8), 1–11. Retrieved from http://arxiv.org/abs/1804.01396 (2018).

[4] Scoble, R., Israel, S. & Benioff, M. R., Age of context: Mobile, sensors, data and the future of privacy, US: Patrick Brewster Press 1st edition (2014).

[5] Lindstrom, M.,Small Data. Plassen Verlag, ein Imprint der Börsenmedien AG (2016). Available at: https://www.perlego.com/book/1045576/small-data-pdf (Accessed: 25 September 2021).

[6] Larrey. P., Connected World: From Automated Work to Virtual Wars: The Future, By Those Who Are Shaping It. Publisher Penguin UK. Published on Mar 2, (2017). Pages 320. ISBN 9780241981191

[7] De Luca, L. M., Herhausen, D., Troilo, G., & Rossi, A. How and when do big data investments pay off? The role of marketing affordances and service innovation. Journal of the Academy of Marketing Science, Volume 49, Issue (4), 790-810 (2021).

[8] Bendle, N. T., & Wang, X. S., Uncovering the message from the mess of big data. Business Horizons, Volume 59, Issue (1), 115-124 (2016).

[9] Moro, S., Rita, P., & Vala, B., Predicting social media performance metrics and evaluation of the impact on brand building: A data mining approach. Journal of Business Research, Volume 69, Issue (9), 3341-3351 (2016).

[10] Erevelles, S., Fukawa, N., & Swayne, L., Big Data consumer analytics and the transformation of marketing. Journal of business research, Volume 6, Issue (2), 897-904 (2016).

[11] Miklosik, A., & Evans, N., Impact of big data and machine learning on digital transformation in marketing: A literature review. Ieee Access, 8, 101284-101292 (2020).

[12] Pappas, I. O., Mikalef, P., Giannakos, M. N., Krogstie, J., & Lekakos, G., Big data and business analytics ecosystems: paving the way towards digital transformation and sustainable societies. Information Systems and e-Business Management, Volume 16, Issue (3), 479-491(2018).

[13] Schwertner, K., Digital transformation of business. Trakia Journal of Sciences, Volume 15 , Suppl. 1, (1), 388-393

(2017).

[14] Jabbar, A., Akhtar, P., & Dani, S., Real-time big data processing for instantaneous marketing decisions: A problematization approach. Industrial Marketing Management, Volume 90, 558-569 (2020).

[15] Wang, J., Zhang, W., & Yuan, S., Display advertising with real-time bidding (RTB) and behavioural targeting. Foundations and Trends® in Information Retrieval, 11(4-5), 297-435 (2017).

[16] Sarker, Md., Wu, M.,Hossin, Md., Smart governance through bigdata: Digital transformation of public agencies. 2018 International Conference on Artificial Intelligence and Big Data (ICAIBD). IEEE, INSPEC Accession Number: 17894265. DOI: 10.1109/ICAIBD. 8396168 (2018).

[17] Liu, J., Li, T., Xie, P., Du, S., Teng, F., Yang, X., Urban big data fusion based on deep learning: An overview. Information Fusion, Volume 53, Pages 123-133 (2020).

[18] Mawed, M., & Aal-Hajj, A., Using big data to improve the performance management: A case study from the UAE FM industry. Facilities, Volume 35, pages (13–14, SI), 746–765 (2017).

[19] Khan, Z., & Vorley, T., Big data text analytics: An enabler of knowledge management. Journal of Knowledge Management (2017).

[20] Johnson, D. S., Muzellec, L., Sihi, D., & Zahay, D., The marketing organization's journey to become data-driven. Journal Of Research In Interactive Marketing, Volume 13, Issue (2), 162–178 (2019). https://doi.org/10.1108/JRIM12-2018-0157

[21] O'Neill, E., 10 companies that are using big data. Retrieved from: https://www.icas.com/insight/technology/10-companies-using-big-data (2016).

[22] Zeng, J., & Glaister, K. W. Value creation from big data: Looking inside the black box. Strategic Organization, Volume 16, Issue (2), 105–140 (2018). https://doi.org/10.1177/1476127017697510

[23] Talón-Ballestero, P., González-Serrano. L., Soguero-Ruiz, C., Muñoz-Romerob, S., Rojo-Álvarez. L., Using big data from Customer Relationship Management information systems to determine the client profile in the hotel sector. Tourism Management Volume 68, October, Pages 187-197 (2018).

[24] Kostakis, P., & Kargas, A., Big-Data Management: A Driver for Digital Transformation? Information, 12(10), 411 (2021).

[25] Lucas, H., Agarwal, R., El Sawy, O., Weber, B., "Impactful Research on Transformational Information Technology: An Opportunity to Inform New Audiences," MIS Quarterly, (37: 2) pp.371-382 (2013).

[26] Kothari. C. R., Research Methodology: Methods and Techniques. New Age International, Analysis of covariance - 401 pages (2004).

[27] Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M., A primer on partial least squares structural equation modeling (PLS-SEM): Sage Publications (2016).

[28] Granados, N., & Gupta, A., Transparency strategy: Competing with information in a digital world. MIS Quarterly: Management Information Systems, Volume 37, Issue (2), 637-641 (2013).

[29] Cao, L., & Li, L., "The Impact of Cross-Channel Integration on Retailers' Sales Growth." Journal of Retailing 91.2 , 198-216 (2015).

[30] Hennig-Thurau, T., Malthouse, E., Friege, C., Gensler, S., Lobschat, L., Rangaswamy, A., Skiera, B., The Impact of New Media on Customer Relationships. Journal of Service Research, Volume 13, Issue (3) 311-330 (2010). sagepub.com/journalsPermissions.nav DOI: 10.1177/1094670510375460 http://jsr.sagepub.com

[31] Huang, Jimmy C., Henfridsson, Ola, Liu, Martin J. and Newell, Susan., Growing on steroids : rapidly scaling the user base of digital ventures through digital innovation. MIS Quarterly, Volume 41, Issue (1) (2017).