



Data-Driven Decision-Making Culture: Managing the Adoption of Big Data Analytics in E-Commerce Organizations

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Abstract: The rapid expansion of e-commerce has generated unprecedented volumes of customer transaction and behavioral data, creating both an opportunity and a challenge for organizational decision-makers. While Big Data Analytics (BDA) offers the potential to transform raw data into actionable business insight, its successful adoption depends not only on technology but on organizational and managerial factors. This study examines role of a data-driven decision-making culture in managing adoption of BDA within e-commerce organizations, and evaluates its downstream effect on managerial decision-making quality. The proposed study utilizes a Technology-Organization-Environment (TOE) framework and tests four hypotheses, termed Top Management Support (H1), Data-Driven Culture (H2), and Organizational Readiness (H3) each positively influencing BDA Adoption, and that BDA Adoption, in turn, positively influences Managerial Decision-Making Quality (H4). Findings specify that all three antecedents have a positive and substantial influence on BDA adoption, with organizational culture having strongest influence among them. This means that although the support of top management and organizational readiness are important for successful BDA adoption, the creation of data-based culture based on the trust of data is even more essential. Furthermore, the outcomes prove that BDA adoption has a positive impact on quality of managerial decision-making. In general, research demonstrates that the implementation of BDA in e-commerce companies is not only a technological but also managerial and cultural task. Therefore, those companies that concentrate only on advanced technologies and ignore managerial and cultural issues will not be able to employ potential of BDA.

Keywords: Big Data Analytics, Data-Driven Culture, Technology Adoption, E-Commerce, Managerial Decision-Making, TOE Framework

Nomenclature

Abbreviation	Description
BDA	Big Data Analytics
TAM	Technology Acceptance Model
DDC	Data-Driven Culture
OR	Organizational Readiness
TMS	Top Management Support
MDQ	Managerial Decision-Making Quality
TOE	Technology-Organization-Environment

1. Introduction

The growth in the scope of e-commerce transactions has led to the generation of more data in terms of volume, velocity, and variety through business transactions conducted on the internet [15]. Each transaction, such as product searching, purchasing, reviewing, and browsing behaviors, creates important data that can help businesses generate knowledge from which they could get insights regarding customer preferences, market dynamics, and their performance as a business [1] [16]. In this respect, BDA is a crucial strategic tool that helps organizations to analyze huge data sets and turn this data into useful knowledge that can be used in making decisions [21] [22]. While BDA brings numerous advantages, there is much more required for its effective deployment other than technology and analytics themselves [17] [18]. For many organizations, it is hard to integrate data analytics into business practices. This is why organizational environment has been seen as an important factor that determines BDA success [2] [19]. Indeed, developing a culture of data-driven decision makes individuals more willing to trust analytical findings and less inclined to depend on intuitive judgment, as well as facilitates collaboration between departments and enables strategic planning [5] [20].

Rapid development in e-commerce has not only changed the way customers purchase goods or services but has also changed the way organizations understand the behavior of their customers and make business decisions [3] [6]. All online activities, such as browsing, viewing pages, adding items to shopping cart, making purchases, leaving reviews, and more, produces huge amounts of data that could

be analyzed to understand the preferences, buying behavior, and current trends on the market [7] [13]. The use of BDA has become vital to turn bulk data produced into insights that would help in generating personalized offers, launching marketing campaigns, inventory management, and customer satisfaction [23] [24]. Although many firms have adopted advanced analytics, it seems that most e-commerce firms still encounter problems in tapping into the full potential of BDA [14]. Such issues arise from organizational rather than technological challenges that include lack of TMS, insufficient organizational preparedness, lack of employee competencies, and reluctance to embrace evidence-based approaches [8] [11] [8]. In light of this, the success of BDA implementation goes beyond having advanced analytical software; it involves creating an organizational environment that is conducive to evidence-based decision-making and effective data utilization [12] [25]. Consequently, this area requires further examination of organizational challenges affecting BDA implementation as well as understanding how analytics-driven approaches improve managerial decisions and business operations is critical in both scholarly and practical circles [9] [10].

This research paper presents the analysis of three important factors in the organization: TMS, DDC, and OR. The research paper is based on the Theory of TOE, which helps to develop four hypotheses. These hypotheses are empirically tested using survey data obtained from managerial, technical, and marketing experts employed in e-commerce organizations. The results obtained from the study are anticipated to provide theoretical perspectives regarding the organizational determinants of BDA adoption and help managers devise strategies for promoting a culture of data-driven management within their organizations.

1.1 Research Objectives

- ✚ To examine the effect of Top Management Support on adoption of BDA in e-commerce organizations.
- ✚ To assess the impact of Data-Driven Culture on adoption of BDA in e-commerce organizations.
- ✚ To evaluate role of OR (IT infrastructure and employee data literacy) in adoption of BDA in e-commerce organizations.
- ✚ To investigate the effect of BDA adoption on quality of managerial decision-making in e-commerce organizations.
- ✚ To provide practical recommendations for e-commerce managers and leaders on how to build a more effective data-driven culture that supports sustained BDA adoption and improved decision-making.

The structure of this study is as follows: Second section includes a review of related literature and hypotheses formation. Third section deals with research methodology and the fourth one focuses on the results and findings. Conclusion of the research is discussed in the fifth section.

2. Literature Review

Literature survey forms theoretical and empirical basis of the current research work by examining the previous works on data-driven decision-making culture, adoption of BDA, and decision-making by managers in e-commerce firms. It analyzes the important concepts, theories, and results of past studies to realize trends in the study, the gaps in research, and the interconnections among the research variables.

2.1 Core Review

The main body of the literature review is structured in accordance with the main constructs and their interrelationships suggested in research. Existing literature on following concepts: TMS, data-driven decision-making culture, OR, BDA adoption, and MDQ is being reviewed. This analysis demonstrates the theoretical and empirical links between the constructs mentioned above, forming the basis for the four research hypotheses that explore effect of organizational factors on BDA adoption and further impact of BDA adoption on MDQ.

Jingshu Yang and Bo Peng [1] suggested an innovative framework, which was based on optimization through GAs in conjunction with BDA and can help augment e-commerce marketing effectiveness. This framework includes three key elements – structured product management, personalized content recommendation and big data driven strategies for social media marketing. The efficiency of the suggested method was checked on the example of three e-commerce companies in China, including firms of small, medium and large scale. Experimental findings showed significant improvements in the performance measures, in which the customer satisfaction increased by 21%, while the efficiency of the advertising strategy augmented by 0.35 points. Furthermore, there is an increase of Marketing Program

Probity measure from 0.60 to 0.91 and Promotion Strategy Completion from 0.53 to 0.88. Thus, it can be seen that GA-based optimization can be used to improve marketing performance measures in firms of various sizes.

H1: Top management support has a significant positive effect on the adoption of BDA in e-commerce organizations.

TMS is anticipated to play a very important part in use of BDA by e-commerce firms. Top management commitment will offer strategic guidance and the resources needed for the success of the BDA strategy. Top managers who are strong supporters of analytics-based initiatives will motivate their staff members to be data-driven, integrate technology, and become less resistant to organizational change. Consequently, high levels of TMS will be beneficial in the successful use of BDA in e-commerce organizations.

Abdalwali Lutf *et al.*, [2] formulated an integrative model under the TOE theory and resource-aided view theory to discover influences affecting adoption of BDA and performance implications of BDA in Jordanian retail industry. The researchers introduced an integrated model that took into consideration both the factors affecting adoption of BDA and performance implication of such adoption. The sample for the research comprised 132 responses assembled from retail organizations in Jordan through an online survey. The results showed that relative advantage, OR, TMS, data variety support, data velocity, and government y significantly influenced the adoption of BDA. In addition, there is a significant relation between the adoption of BDA and firm performance. Therefore, the efficient adoption of BDA could advance the capabilities of organization and lead to better organizational performance.

H2: A strong data-driven decision-making culture has a significant positive effect on adoption of Big Data Analytics in e-commerce organizations.

Shahrokh Nikou *et al.*, [3] formulated a conceptual framework by modifying the TAM to include two extra variables, namely, information literacy and digital literacy, to discover effect of these variables on intention of employees to adopt digital technologies at work. The study suggested that information literacy and digital literacy serve as indirect determinants by affecting the perception and attitude to usage of technology. Data were acquired from 121 participants, and structural equation modeling was employed to prove validity of relationships in study. The results showed that information and digital literacy had a strong direct effect on the perception of ease of use, implying that the employees having more digital skills could easily grasp and use workplace technology. In addition, no direct effect of the information literacy and digital literacy on perception of utility was observed. Moreover, the study results showed that the information and digital literacy had an unintended effect on meaning of the use of digital technologies via technology use attitude.

H3: Organizational readiness (IT infrastructure and employee data literacy) has a significant positive effect on the adoption of Big Data Analytics in e-commerce organizations.

Ranjan Chaudhuri *et al.*, [4] studied the effects of the organization's data-driven organizational culture on performance, innovation of the product and organizational performance. For this purpose, the study created a conceptual framework and formulated some hypotheses with existing literature, resource-based view theory, and dynamic capability theory to explore effects of organizational context. Conceptual framework of the study was statistically validated using a survey sample comprising 513 respondents obtained from the employees of different organizations who used AI enabled business analytics solutions. It was found that strong data-driven organizational culture had a significantly moderating effect on the process improvement and innovation of the product, and in turn, it helped to achieve better organizational performance and higher business range.

H4: Big Data Analytics adoption has a significant positive effect on the quality of managerial decision-making in e-commerce organizations.

2.1 Problem Statement

E-commerce firms nowadays have large amounts of customer data at their disposal, but they have been unable to leverage this data to drive value for themselves. While there have been major expenditures on BDA technologies, implementation of these technologies is either inconsistent or shallow since these firms are collecting data but are unable to use the same for decision-making purposes. This inconsistency between data collection and data use is usually the result of poor management and organization practices and not lack of technology because of inadequate support from top management, among others [1].

Moreover, even in instances where the organization decides to implement BDA, the true effect on decision quality is ambiguous and not always understood. In most cases, the organization assumes that once analytics are implemented, good decisions will come automatically. However, the question of whether the appropriate organizational culture, leadership and organizational capacity is there to support the change is often overlooked [2]. The problem here is that the organization might invest in

BDA without fully understanding what organizational context is needed and whether adoption really results in improved decision quality. Hence, the research described in this study is to answer the question regarding the extent of the influence exerted by the organizational context elements, such as TMS, data-based culture, and OR on adoption of BDA in e-commerce companies and on decision-making quality improvement. Otherwise, an organization runs the risk of having to make expensive investments in analytics capacity but failing to get better decision-making results. At the same time, there is a gap in the theoretical understanding of the issue [3] [4].

3. Methodology

Research hypotheses developed directed this research in analyzing relations among constructs of the data-driven decision-making culture and implementation of BDA within e-commerce companies. In order to make the analysis systematic, a research methodology is adopted, which included a literature review, hypothesis development, research model development, data collection, and data analysis. According to theoretical framework and previous empirical studies, research constructs were divided into independent, dependent, mediating, and moderating variables. Data collected was statistically examined by the use of IBM SPSS Statistics 26 and IBM SPSS AMOS 23.0.0. Fig. 1 specifies the hypothetical structure.

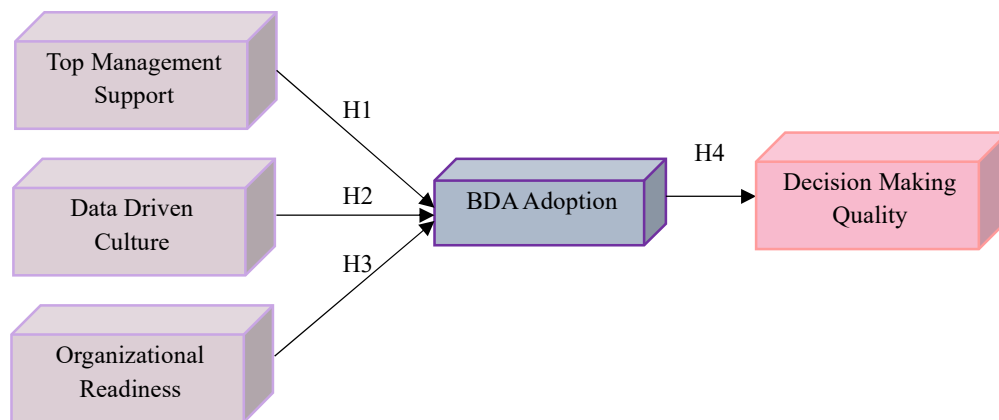


Fig. 1. Hypothetical Structure

3.1 Research Variables

This research is based on three independent variables, namely TMS, DDC, and OR that affect the implementation of BDA in the organizations. BDA Adoption acts as the mediating variable, and MDQ acts as the dependent variable in the model. All these variables form the conceptual framework for the research on the factors affecting the BDA adoption and its effects on managerial decision-making.

3.2 Sampling and Data Collection

Target population encompassed employees and managers working in e-commerce organizations. A structured questionnaire was utilized as a primary instrument for data collection, and responses were obtained using a survey method. A total of 220 valid questionnaires were collected and considered suitable for analysis. The sampling process and data collection procedures were conducted systematically to safeguard reliability and adequacy of data for subsequent statistical evaluation.

3.3 Data Analysis

So as to analyze whether reliability and validity of measurement tool have been achieved, characteristics of the sample have been provided, and research hypotheses tested, suitable statistical procedures have been utilized on the data collected. The statistical analysis involved data screening, descriptive statistics, reliability test, correlation analysis, and testing of the structural model. The statistical software that has been used is IBM SPSS for preliminary analysis and IBM SPSS AMOS 23.0.0 for validating measurement and structural models.

3.4 Demographic Characteristics

Table 1 demonstrates the demographics of responders that took part in the study for an analysis of distribution of various characteristics amid participants concerning adoption of BDA in e-commerce firms. Demographics under investigation in the study include position, experience, firm size, and BDA usage.

- Job Position:** Majority of the sample participants are in mid-level managerial jobs (27.3%), while others have been taken from marketing/sales (22.7%), data/analytics (20.5%), IT/technical (19.1%), and top-level managers/executives (10.5%).
- Work Experience:** In terms of work experience, the maximum number of people have experience of 1-3 years (34.1%), followed by 4-6 years (32.3%), 7-10 years (17.3%), more than 10 years (8.2%) and less than 1 year (8.2%).
- Organization Size:** With respect to organization size, most of the respondents belong to organizations with employee strength of 201-500 (30.9%), followed by 50-200 (26.8%), less than 50 (17.3%), 501-1000 (15.9%) and more than 1000 (9.1%).
- Usage of BDA:** In the case of the usage of BDA, 65.5% of the participants stated that their organization uses BDA, 20% of the participants stated that their organization does not use BDA, and 14.5% of the participants were unsure whether their organization uses BDA or not. It is clear from this distribution that most of the organizations are using BDA.

Table 1. Demographic Analysis

Variable	Category	n	%
Position	Middle Management	60	27.3%
	Marketing/Sales Team	50	22.7%
	Data/Analytics Team	45	20.5%
	IT/Technical Team	42	19.1%
	Top Management/Executive	23	10.5%
Experience	1-3 years	75	34.1%
	4-6 years	71	32.3%
	7-10 years	38	17.3%
	More than 10 years	18	8.2%
	Less than 1 year	18	8.2%
Organization Size	201-500	68	30.9%
	50-200	59	26.8%
	Less than 50	38	17.3%
	501-1000	35	15.9%
	More than 1000	20	9.1%
Uses of BDA	Yes	144	65.5%
	No	44	20%
	Not sure	32	14.5%

4. Results and Analysis

4.1 Reliability Analysis (Cronbach's Alpha)

Table 2 specifies the reliability analysis. Cronbach's Alpha was used to assess reliability of measurement scale to determine internal consistency of items calculating each construct. The Cronbach's Alpha is a reliable reliability examine that assesses how consistent the items in a construct are in measuring the same concept. Typically, an alpha score of 0.70 or more is deemed reliable. Based on the results, it is clear that all five constructs were found to be reliable enough. First, the TMS construct that had five items had a Cronbach's Alpha of 0.755. It indicates that items of this construct were quite reliable for measuring the concept. Similarly, the DDC construct had an alpha value of 0.762, reflecting that its five items are reliable enough. In this regard, it is important to point out that the OR construct had the highest level of reliability as its Cronbach's Alpha was 0.791. It implies that items of this construct can measure the concept in a very consistent way. Finally, it should be emphasized that the alpha values of both BDA (0.749) and MDQ (0.768) construct were above the required one. The Cronbach's alpha scores range among 0.749 and 0.791, implying that the internal consistency is adequate for all constructs. It should be noted that none of the constructs had reliability scores lower than the recommended 0.70 level, which means that the questionnaire items are consistent and reliable. This suggests that the measurement tool is reliable enough for conducting various statistical analyses, including correlation analysis, regression analysis, or even structural equation modeling. Hence, the constructs can be used for testing the hypotheses.

Table 2. Reliability Analysis

Construct	No. of Items	Cronbach's Alpha	Remark
TMS	5	0.755	Acceptable
DDC	5	0.762	Acceptable
OR	5	0.791	Acceptable
BDA	5	0.749	Acceptable
MDQ	5	0.768	Acceptable

4.2 Descriptive Statistics of Study Constructs

Table 3 displays descriptive statistics of five study constructs with regards to mean, standard deviation, minimum and maximum values. Mean values show the average values obtained from the participants' response to each of the five constructs while standard deviation shows the dispersion in their responses. Out of all the constructs, TMS scored highest mean score ($M = 3.60$, $SD = 0.56$). This implies that the respondents had mostly a favorable perception about this construct. Following TMS, BDA had a mean score of 3.55 and standard deviation of 0.54. This implies that responses were relatively consistent with low variability. MDQ construct has a mean score of 3.48 and standard deviation of 0.58. This suggests that the responses were moderately positive and relatively consistent. Like MDQ construct, DDC also scored the same mean score of 3.46 and SD of 0.58. This implies that the responses were relatively consistent and agreeable among the participants. OR construct has the lowest mean score of 3.36 and SD of 0.63. The minimum values were between 1.4 and 2.2, while the maximum values were between 4.8 and 5.0, showing that respondents used a wide span of the measure scale. In general, all constructs showed mean values higher than the mid-scale value, showing positive perceptions regarding the variables investigated. Moreover, since the standard deviation values obtained are moderate (0.54 to 0.63), it shows that the responses from the participants were consistent without any signs of dispersion. This allows getting a preliminary insight into the distribution of the data and its appropriateness for inferential analysis.

Table 3. Descriptive Statistics

Construct	Mean	SD	Min	Max
TMS	3.60	0.56	1.8	4.8
DDC	3.46	0.58	1.8	4.8
OR	3.36	0.63	1.4	5.0
BDA	3.55	0.54	2.0	4.8
MDQ	3.48	0.58	2.2	4.8

4.3 Correlation Analysis

Table 4 expresses Pearson correlations of five constructs under investigation: TMS, DDC, OR, BDA, and MDQ. Correlation coefficient values can range between -1 and +1, and positive values suggest that there is a positive correlation between the constructs. There is a significant positive correlation between TMS and DDC ($r = 0.362$, $p < 0.01$), OR ($r = 0.338$, $p < 0.01$), and BDA ($r = 0.332$, $p < 0.01$); however, the correlation between TMS and MDQ ($r = 0.112$) is weak and insignificant. The correlation between DDC and OR ($r = 0.363$, $p < 0.01$), DDC and BDA ($r = 0.423$, $p < 0.01$), and DDC and MDQ ($r = 0.160$, $p < 0.05$) is statistically significant. Likewise, there is a significant positive correlation between OR and BDA ($r = 0.326$, $p < 0.01$) and OR and MDQ ($r = 0.226$, $p < 0.01$). The highest correlation is between BDA and DDC ($r = 0.372$, $p < 0.01$). Generally, the correlation coefficients are between 0.112 and 0.423, showing that the relations among concepts are weak to moderately positive. In view of the fact that no single coefficient exceeds the standard threshold of 0.80, multicollinearity does not appear to be an issue. The constructs can be said to be different enough for multivariate analysis.

Table 4. Correlation Analysis

	TMS	DDC	OR	BDA	MDQ
TMS	1.000	0.362**	0.338**	0.332**	0.112
DDC	0.362**	1.000	0.363**	0.423**	0.160*
OR	0.338**	0.363**	1.000	0.326**	0.226**
BDA	0.332**	0.423**	0.326**	1.000	0.372**
MDQ	0.112	0.160*	0.226**	0.372**	1.000

4.4 Hypothesis Testing

The findings of the hypothesis testing support the research model since TMS, DDC, and OR have a significant and positive impact on BDA Adoption, supporting hypotheses H1–H3. From all the factors, it can be noted that DDC had the greatest predictive power, thus underlining the significance of a DDC for an organization in terms of successful analytics adoption. Moreover, the hypothesis H4 is supported by the results which prove that BDA Adoption has a substantial positive effect on MDQ.

4.4.1 Hypotheses H1–H3: Effect of TMS, DDC, and OR on BDA Adoption

Table 5 a multiple linear regression analysis was done to determine effects of TMS, DDC, and OR on BDA Adoption and test Hypotheses H1-H3. The multiple regression model used in the analysis was statistically significant ($R^2 = 0.236$, Adjusted $R^2 = 0.226$, $F(3, 216) = 22.301$, $p < .001$). Therefore, the three independent variables explain 23.6% of the variance in BDA Adoption. The regression coefficients show that TMS has a positive and significant impact on BDA Adoption ($B = 0.164$, $t = 2.568$, $p = 0.011$), indicating that an augments in TMS results in BDA adoption. In addition, DDC shows the most positive impact on BDA Adoption ($B = 0.285$, $t = 4.598$, $p < .001$), which means that the organization's DDC has an impact on adoption of BDA. Therefore, Hypothesis H2 is proved. OR has a positive and noteworthy impact on BDA Adoption ($B = 0.135$, $t = 2.404$, $p = 0.017$), which means that high OR influences the adoption of BDA in a positive way, and Hypothesis H3 is proved as well. Among three variables, DDC turned out to be the most significant due to the highest regression coefficient. It can be concluded that all three organizational factors positively affect BDA Adoption.

Table 5. Effect of TMS, DDC, and OR on BDA Adoption

Variable	B	Std. Error	T	Sig.
(Constant)	1.516	0.257	5.896	<.001
TMS	0.164	0.064	2.568	0.011
DDC	0.285	0.062	4.598	<.001
OR	0.135	0.056	2.404	0.017

4.4.2 Hypothesis H4: Effect of BDA Adoption on Managerial Decision-Making Quality

Table 6 specifies the Effect of BDA adoption on MDQ. Simple linear regression was employed to find out the role of BDA Adoption on dependent variable. It can be seen from output that regression equation is statistically significant. Regression coefficient of independent variable (BDA adoption) is positive and significant ($B = 0.399$, $t = 5.915$, $p < .001$). It means that there is a significant increase in the dependent variable with an increase in BDA adoption. For instance, an increase of 1 unit in BDA Adoption leads to an increase of 0.399 units in outcome variable. The constant ($B = 2.063$, $p < .001$) is the expected range of dependent variable when score of BDA adoption is zero. From the p-value of BDA Adoption being less than 0.001, the relationship is highly significant.

Table 6. Effect of BDA Adoption on MDQ

Variable	B	Std. Error	T	Sig.
(Constant)	2.063	0.242	8.516	<.001
BDA	0.399	0.067	5.915	<.001

4.5 Summary of Hypothesis Testing

Table 7 offers findings from hypothesis testing of proposed relationships between study constructs. Results reveal that all the four hypotheses (H1–H4) hold since all the proposed relationships exhibit a significant positive effect. In case of H1, the relationship between TMS and BDA adoption is positive and significant ($B = 0.164$, $p = 0.011$). This implies that higher the support from the top management, the more likely the organization is to adopt BDA. Hence, H1 holds. The influence of DDC on BDA adoption (H2) proves to be substantial, positive ($B = 0.285$), and statistically significant at $p < .001$ level. Out of all the constructs tested as predictors of BDA Adoption, DDC has the highest regression coefficient. It means that the presence of the culture of making decisions based on data positively influences BDA Adoption. Therefore, H2 is confirmed. OR positively impacts BDA adoption ($B = 0.135$, $p = 0.017$). This finding suggests that resources, infrastructure, and readiness of the organization have a crucial impact on the encouragement of BDA adoption. Therefore, H3 is confirmed. Finally, H4 tests the influence of BDA Adoption on MDQ, and there is found to be a significant positive influence ($B = 0.399$, $p < .001$). Thus, the increase in the BDA adoption has a statistically significant positive effect on value of MDQ. Comparatively higher coefficient implies that BDA adoption has a considerable impact on the dependent construct. The results showed all four hypotheses to be statistically proven. It can be concluded from the

study that TMS, a data-driven organization culture, and OR are all important predictors of BDA adoption in e-commerce firms, which in turn improves decision making.

Table 7. Summary of Hypothesis Testing

Hypothesis	Path	B (coef.)	Significance	Result
H1	TMS → BDA Adoption	0.164	p = 0.011	Supported
H2	DDC → BDA Adoption	0.285	p < .001	Supported
H3	OR → BDA Adoption	0.135	p = 0.017	Supported
H4	BDA Adoption → MDQ	0.399	p < .001	Supported

5. Discussion of Findings

The results of this research have yielded important findings regarding the factors affecting BDA Adoption and their impact on MDQ. Specifically, the results show that TMS, DDC, and OR affect the BDA Adoption positively and significantly, confirming H1, H2, and H3. Out of these variables, DDC turned out to be a most influential factor. This shows that organizational culture that emphasizes decisions made using the data is crucial for the successful adoption of the BDA solutions. The significant effect of the TMS variable proves the importance of the commitment and encouragement from the top management when implementing BDA solutions. In addition to this, the results have shown that there is a substantial impact of BDA Adoption on MDQ, thus validating H4. This implies that companies that adopt BDA will have an easier time improving their decision-making process, effectiveness, and management processes based on data. This suggests that BDA adoption acts as a major way in which organizational capabilities can be turned into outcomes. On the whole, this research has brought out the fact that for BDA adoption to be successful, it needs to involve a number of elements including managerial support, a strong data-oriented culture, and OR.

5.1 Practical Implications

The practical recommendations in accordance with results of the study include various suggestions for e-commerce businesses aimed at improving their ability to conduct BDA and enhance their decision-making process. First of all, the results imply that the most influential element is the existence of a DDC in the organization. In other words, the company should not focus on the implementation of new technologies only but try to establish the culture when data becomes a vital part of the decision-making process. In order to do that, managers have to persuade their employees at all organizational levels to use the data-driven approach instead of relying on their experience and intuition. The importance of TMS makes this point even clearer. The senior management has to become engaged in projects involving analytics through creating the right strategy, providing funds for the project, and ensuring the integration of analytics into organizational processes. The commitment of the leadership will ensure that the BDA project becomes more than just a simple experiment. Positive contribution of OR reiterates the notion that organizations require proper infrastructure, technology, and proper skill set of employees. Organizations working in the area of e-commerce should seriously think about holding some training sessions for their employees to ensure that the employees are able to analyze data and draw appropriate conclusions from BDA systems. Finally, the highly important relationship between BDA Adoption and improved quality of managerial decision-making implies that BDA needs to be viewed as a business capability, rather than as a technological one.

5.2 Theoretical Implications

This research paper contributes significantly to current literature on BDA adoption and decision-making process from a theoretical perspective in various ways. First of all, the applicability of the TOE model is broadened as it goes beyond the usual perspective of technological adoption being the ultimate goal of the process. While most of the TOE-model related researches have mainly focused on role of various factors, technological, organizational and environmental, in process of adopting new technologies, this paper enhances this theoretical framework through empirical evidence on how organizational-level factors, namely, TMS, DDC and OR impact BDA adoption and help improve decision quality. Second, the study provides empirical evidence that the impact of BDA implementation is more pronounced when influenced by socio-organizational aspects compared to purely technical aspects. The fact that DDC emerges as the most influential predictor of BDA implementation emphasizes the significance of organizational culture, employee behavior, and decision-making processes in leveraging the potential of analytics technology. In other words, the study confirms that the intangible organizational resources, namely, an analytical culture and data orientation, can play at least the same but probably even greater importance than the

tangible technological resources within the framework of RBV approach towards BDA capabilities. Finally, this paper brings in a management point of view to an area that has always concentrated on technical and computational studies with respect to development of algorithms, data-processing techniques, and system design. In bringing in the organizational behavior and managerial decision-making viewpoints into BDA studies, this study fills the void between the development of the capabilities of technology and the creation of business value. This paper makes it clear that the ultimate success of BDA is not only dependent on the presence of the analytical systems but on how organizations utilize them as well. Lastly, the research methodology is strengthened through the validation of a model of measurement where all the constructs exhibit satisfactory reliability and significance. The proposed framework and measurement tool form an effective starting point for any future researchers examining the issue of BDA adoption and its implications within the organization. The model can be modified and used in other industries, such as healthcare, banking, manufacturing, and public sector; thus, broadening the scope of BDA adoption beyond the e-commerce field.

6. Conclusion

The objective of this study was to examine the effect of organizational factors, like TMS, DDC, and OR on adoption of BDA in e-commerce firms and the effect of BDA adoption on quality of managerial decisions made. Based on the TOE model, four hypotheses were developed and empirically tested using survey-based data collected from employees occupying managerial, technical, and marketing roles in e-commerce firms. It has been found that all the three antecedents have a positive and significant impact on BDA adoption, with the latter being the strongest among the three. This indicates that although TMS and OR do play their role, it is a more difficult intangible factor that contributes to the success of big data implementation – an organizational culture of trusting data. The research results also support the positive impact of BDA adoption on the quality of managerial decisions. When considered collectively, these findings help reinforce the main idea of this study in that BDA implementation in e-commerce is not just a technical but also a management and culture problem. Organizations that will concentrate only on the procurement of appropriate technology but neglect the issues of managerial commitment and cultural preparedness will never be able to achieve the decision-making advantages provided by BDA. Theoretically, this research enhances the literature on the growing issue of adoption of BDA by expanding the TOE framework, which traditionally involves analysis of adoption of technology. In this regard, prior studies have largely been concerned with determining the factors affecting either adoption or non-adoption of technology, while this study takes a more holistic approach to understanding the adoption to impact process by showing how the adoption of BDA leads to better managerial performance. The connection between antecedents of the organization, adoption of BDA, and quality of decision-making is shown here in order to demonstrate that the use of analytics is not enough, but its organizational application is key. From an applied point of view, the results serve to offer a strategic map for e-commerce managers and decision makers with regard to how they can derive the maximum benefit from their BDA investments. Companies need to work towards the creation of a robust data culture, which will help them encourage their workers to make use of data in their decision-making processes and strategy formulation. On the other hand, the continued dedication of the top management becomes vital when it comes to ensuring that enough resources have been allocated to this process.

6.1 Limitations and Future Scope

This research has some limitations that required to be taken into account while interpreting findings. First limitation is inherent in design of the cross-sectional survey used in this study. It allows us to understand how variables relate to each other within a single snapshot of time. Consequently, it does not allow for a deeper analysis of how the situation is changing over time and does not enable building solid causal connections. Second, this research is focused on the particular field of e-commerce. Therefore, it may be difficult to generalize our findings to other business contexts. These limitations can be overcome in future research by conducting longitudinal studies, cross industry analysis and considering additional factors, like data governance, organizational agility, analytics capability maturity and data literacy of employees.

Compliance with Ethical Standards

Conflicts of interest: Authors declared that they have no conflict of interest.

Human participants: The conducted research follows the ethical standards and the authors ensured that they have not conducted any studies with human participants or animals.

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